Perceived Chronic Stress and Implicit Motives in Middle-Aged Men

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Abstracts

For an individual, the experience of chronic stress may result in reduced well-being and mental health. However, these relationships can be influenced by personality characteristics. This thesis aimed to investigate the role of implicit motives in perceived chronic stress and its association with mental health. In study 1, subtypes of work-related and social stress were positively associated with vital exhaustion. Implicit motives for affiliation and achievement were linked to social support and chronic stress, and indirectly to vital exhaustion. Moreover, they moderated certain relationships between stress and exhaustion. In study 2, fathers with biological children rated their degree of perceived constraint due to fatherhood (PC) as well as life satisfaction. PC had a negative influence on life satisfaction. A higher implicit need for affiliation was significantly associated with lower PC, whereas the implicit need for power had the opposite effect. Structural equation modeling revealed significant indirect effects of implicit affiliation and power motives on life satisfaction mediated by PC. In conclusion, implicit motives are key factors in the stress process: They are involved in an individual's experience of stress and stress-related consequences for mental health.

Chronisches Stresserleben kann das Wohlbefinden und die Gesundheit einer Person beeinträchtigen, wobei diese Zusammenhänge durch Persönlichkeitsfaktoren beeinflusst werden können. In der vorliegenden Dissertation wurde untersucht, welche Rolle implizite Motive als Teil der Persönlichkeit im chronischen Stresserleben und dessen Assoziation mit mentaler Gesundheit spielen. In Studie 1 waren Subtypen von arbeitsbezogenem und sozialem Stress positiv mit vitaler Erschöpfung assoziiert. Die impliziten Motive für Bindung und Leistung standen in Zusammenhang mit sozialer Unterstützung und chronischem Stress und indirekt mit vitaler Erschöpfung. Zudem moderierten Sie gewisse Zusammenhänge zwischen Stress und Erschöpfung. In Studie 2 bewerteten Väter mit biologischen Kindern ihre Lebenszufriedenheit und wie stark sie sich durch die Vaterschaft eingeschränkt fühlten. Die wahrgenommene Einschränkung hat einen negativen Einfluss auf die Lebenszufriedenheit. Das Bindungsmotiv war signifikant positiv assoziiert mit tieferer Einschränkung, wohingegen das Machtmotiv den gegenteiligen Effekt hatte. Ein Strukturgleichungsmodell zeigte zudem einen signifikanten indirekten Effekt von Bindung und Macht auf die Lebenszufriedenheit, mediiert durch die wahrgenommene Einschränkung. Zusammenfassend sind implizite Motive Schlüsselfaktoren im Stressprozess: Sie sind an der individuellen Wahrnehmung von Stress und dessen Folgen für die mentale Gesundheit beteiligt.

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Dedication

The climb may be hard,
but the view is great.

To the people in my life who have stayed with me through all these years. I am eternally grateful for your love and support, without which this work would not have been completed. Thank you!

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Tables

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Abbreviations

ACTH	Adrenocorticotropic hormone
AI	Activity inhibition
ANS	Autonomic nervous system
CHD	Coronary heart disease
CRH	Corticotropin releasing hormone
DSM	Diagnostic and Statistical Manual of Mental Disorders
GC	Glucocorticoid
HPA axis	Hypothalamic-pituitary-adrenal axis
MVEQ	Maastricht Vital Exhaustion Questionnaire
*n*Ach	Implicit motive for achievement
*n*Achievement	Implicit motive for achievement
*n*Aff	Implicit motive for affiliation
*n*Affiliation	Implicit motive for affiliation
NKCA	Natural killer cell activity
*n*Pow	Implicit motive for power
*n*Power	Implicit motive for power
OMT	Operant Motive Test
PNS	Parasympathetic nervous system
PSE	Picture Story Exercise
PSS	Perceived Social Support
SAM	Sympathetic adrenal medullary system
sIgA	Secretory Immunoglobulin A
SNS	Sympathetic nervous system
TICS	Trierer Inventar für Chronischen Stress
VE	Vital exhaustion
VAS	Visual analogue scale
WHO	World Health Organization

1. Introduction

"Stress" has become a widespread term in our everyday lives. In the last years, stress and its consequences have become a pressing public health issue. The World Health Organization (WHO) has even called stress the "health epidemic of the 21st century". Every few years, a representative sample of the Swiss population is questioned about their experience of stress. More than one third of the Swiss working population report feeling often or very often stressed (Grebner, Berlowitz, Alvarado, & Cassina, 2010). Similar numbers were reported for other European countries and the United States (APA, 2016; European Agency for Safety and Health at Work, 2009; Techniker Krankenkasse, 2016). Work and financial worries are rated as the number one source of stress (APA, 2016). Observed increases in work-related stress are the result of major economic changes. In the course of globalized capitalism, companies struggle to remain competitive in an international market (Primm, 2005; Siegrist & Wahrendorf, 2016). And while technology progress and innovation offer new possibilities, they also pose a challenge due to an overload of information. In a quest to increase productivity, employees are reporting an intensification and accelerated pace of their work due to time pressure. This increasing pressure renders work more demanding and stressful and leaves employees anxious about the stability and security of their jobs (Burchell, 2002; Gallie, 2013). As men are still the primary breadwinner in many families, they are particularly prone to the experience of work stress. At the same time, fathers are expected to actively participate in the upbringing of their children (Henwood & Procter, 2003). Higher demands at work and changes in family role expectancies also increase stress in the family context or from maintaining work-life balance (Kotowska et al., 2010; Nomaguchi, 2009). Due to these multiple challenges, midlife is a pivotal period for an individual (Lachman, Teshale, & Agrigoroaei, 2015).

The experience of chronic stress constitutes a substantial financial burden for society; a recent review investigating more than twenty countries reported the cost of work-related stress to range from US$220 million to US$190 billion (Hassard, Teoh, Visockaite, Dewe, & Cox, 2017). In Switzerland, chronic stress results in health costs of approximately 8 billion Swiss francs a year (Ramaciotti, & Perriard, 2003). This includes individual costs such as medication as well as operating costs such as loss in productivity when a worker is on sick leave (Michie & Williams, 2003). The American Institute of Stress (n.d.) estimates that stress costs American businesses approximately US$300 billion a year.

On an individual level, stress causes immense costs for one's own health and well-being. A significant proportion of adults indicated major consequences of stress for their physical and

mental health, resulting in several different health problems (APA, 2016). According to the American Psychological Association (2007), stress is linked to six of the ten leading causes of death. Physiological consequences of chronic stress experience include cardiovascular problems, metabolic and autoimmune diseases, or even structural changes in brain regions (Chrousos, 2009; Cohen, Janicki-Deverts, & Miller, 2007; Gianaros et al., 2007). Regarding psychological well-being and mental health, chronic stress contributes to anxiety and depression (Hammen, Kim, Eberhart, & Brennan, 2009; Siegrist, 2008). Moreover, 20% of the Swiss population reported feeling emotionally exhausted due to work stress (Bundesamt für Statistik, 2014).

The increasing prevalence rates of chronic stress pose a major risk for the development or deterioration of negative health states and are an increasing burden for our health systems (Chrousos, 2009; Schmidt, Sterlemann, & Müller, 2008). Therefore, it is essential to understand the underlying pathways that lead to the perception of stress and the potentially arising impairments for one's health and well-being. Individuals differ in the way they appraise and cope in potentially stressful situations (Lazarus & Folkman, 1984). These differences partly arise from individual personality characteristics. Earlier research has largely focused on traditional personality traits such as the Big Five in explaining the experience of stress and the negative consequences for health (e.g., Ebstrup, Eplov, Pisinger, & Jørgensen, 2011; Mroczek & Almeida, 2004). However, motivational aspects of personality such as implicit motives have been largely neglected. The implicit motives for affiliation, achievement, and power constitute basic human needs (Schultheiss, 2008). They have a significant impact on our lives as they influence our perception, cognition, affect, and behavior (McClelland, 1987). As such, they are likely to influence the experience of chronic stress and the development of subsequent negative health states. Yet, corresponding research is scarce.

Hence, the aim of the present thesis is to investigate the role of implicit motives in perceived chronic stress and individual health and well-being in two different samples of middle-aged men. This thesis comprises three main parts. In the first part, a broad theoretical background is provided. The concept of chronic stress and its relation to health and well-being are introduced. Implicit motives are defined and their role in the experience of stress and an individual's health and well-being is described. The first part concludes with a summary and the derivation of the research questions. In the second part of this thesis, two empirical studies investigating the study hypotheses are presented. The third part consists of a general discussion that includes a summary and integration of the results of the empirical studies. After carefully discussing the limitations of the findings, conclusions for future research and practical implications are drawn.

Part I: Theoretical Background

2. The Concept of Perceived Chronic Stress

In modern culture, the term "stress" has received great popularity and is a constant subject both in media and people's heads. Despite this widespread use in everyday lives, there is no consensus in research regarding the definition of stress (Dewe & Trenberth, 2004). However, both the choice of research methods as well as the interpretation of the results depend on the definition applied. Therefore, the first chapter concerns the definition of stress and an introduction to different stress theories.

2.1 Definition of Stress and Stress Theories

In a first step, it is important to distinguish between "stressor" and "stress" (Selye, 1974). The term "stressor" describes a negatively appraised stimulus or event. As such, a stressor has the potential to precipitate "stress" but is not stress itself (Beehr & Franz, 1987). Accordingly, stress is an individual's mental or physical reaction to a stressor (Selye, 1974). During the last century, several different theories regarding the development of stress, and consequently its conceptualization, have emerged. These theories broadly fall into one of three categories depending on whether stress is seen as a response, a stimulus, or the result of an interaction process (Schwarzer & Schulz, 2001).

In early, more biologically driven approaches, stress was described as a non-specific physiological response to a threat (Cannon, 1914). Hence, the physiological stress reaction is triggered automatically in response to a stressor, independent of the nature of the stressor or the affected person. In Cannon's view (1939), stress disturbs homeostasis, the body's maintenance of a stable internal environment. He defined stress as a physiological reaction involving the activation of the sympathetic nervous system in order to mobilize energy for fight or flight behavior (Cannon, 1939). Deriving from his observations in animals, that different types of noxious stimuli resulted in the same biological reaction, Selye (1950) further introduced the "General Adaptation Syndrome". He saw stress as an alarm reaction that, if ongoing, would end in exhaustion.

Holmes and Rahe (1967) had a stimulus-oriented conceptualization of stress. In their medical work, they had observed that critical life events often preceded an illness of their patients. They concluded that both positive or negative critical life events evoked changes in an organism, which by itself were stressful.

Both response and stimulus theories of stress have received criticism (Cox, 1990; Schwarzer, 2000; Thoits, 1983). A major point of criticism refers to the ignorance of the person exposed to the stressor, including their emotions and cognitions. In these earlier stress theories, the individual had a passive role without contributing to the onset or development of the stress reaction (Sutherland & Cooper, 1990).

In contrast to other traditional behaviorists, Lazarus (1966, 1991) did not assume that stress was a mere stimulus-response reaction. His cognitive-transactional model of stress is one of today's most influential and accepted theories of stress. He observed that objectively similar stimuli could evoke diverse responses in different individuals. He concluded that stress is not caused by the stressor per se but is the result of an interaction between a person and their environment. Stress would then occur in a process of individual appraisal of a stressor. In a primary appraisal, a person subjectively evaluates the situation at hand as either irrelevant, stressful, or positive (Lazarus & Folkman, 1984). A beneficial or challenging evaluation of the situation offers the possibility for some sort of gain, such as mastery of the situation or personal growth. A stimulus is being appraised as stressful when it poses a threat, harm, or loss to an individual. Each appraisal is accompanied by specific emotions such as fear in the face of a threat. In a simultaneous secondary appraisal, a person compares the situational demands to their own available resources in order to determine their possibility to cope with the stressor (Lazarus & Folkman, 1984). These resources include personal goals and values, generalized expectancies, and motivational dispositions. Only if an individual appraises a situation as stressful and exceeding their resources, a stress reaction will occur.

The theories outlined above provide an explanation on how a stressor would end in the experience of stress. According to the transactional stress theory, stress is a dynamic interplay between an objective stressor and an individual's perception of this stressor (Lazarus, 1977). Therefore, this individual cognitive appraisal process is responsible for any emotional, physiological, or behavioral responses to a stressor (Goldman, Glei, Seplaki, Liu, & Weinstein, 2005). In the following chapter, the physiological processes of an acute stress reaction are described.

2.2 Biological Stress Reaction

As outlined in the previous chapter, internal or external stressors challenge an organism's homeostasis (Cannon, 1939; Chrousos, Loriaux, & Gold, 1988). In response, an evolutionary formed biological stress reaction is triggered, that actively restores the physiological balance of

the bodily systems and ensures the organism's survival (McEwen, 1998). Furthermore, it leaves an individual prepared for similar challenging situations we might experience in the future (Kirby et al., 2013). Sterling and Eyer (1988) have termed this evolutionary formed process "allostasis" and emphasized its active and adaptive nature. The body's adaptation to internal or external demands includes a complex interaction of physiological systems and their mediators such as stress hormones or neurotransmitters.

The biological stress reaction is being regulated by the autonomic nervous system (ANS) and the HPA axis. The ANS is responsible for controlling and maintaining the homeostasis of the body's internal environment. The parasympathetic and sympathetic nervous system (PNS and SNS) are parts of the ANS and have antagonistic functions. Among others, they regulate the cardiovascular, endocrine, gastrointestinal, and respiratory system (Chrousos, 2007). In an acute stress reaction, the medulla oblongata in the lower brainstem secretes acetylcholine. This neurotransmitter stimulates the release of catecholamines (e.g., epinephrine), which facilitate the fight-or-flight reaction. Blood flow to relevant organs such as the heart, brain, and larger muscles increases. Additionally, the heart rate speeds up, bronchial passages widen, digestion and activity of the reproductive system are slowed down, and glucose as an energy supply is made available (Chrousos & Gold, 1992). These physiological changes ensure increased alertness, arousal, and focused attention as adaptive functions in response to stress, while non-adaptive processes such as reproduction are inhibited (Cannon, 1939).

The HPA axis is also involved in the neuroendocrine stress response. Neurons in the hypothalamus release corticotropin releasing hormone (CRH), which in turn, leads to the secretion of adrenocorticotropic hormone (ACTH) in the anterior pituitary gland (Ehlert, 2010; Kirschbaum & Hellhammer, 1999; Weiner, 1992). ACTH then stimulates the adrenal glands to excrete glucocorticoids (GC) into the circulation. Cortisol as the principal glucocorticoid has a wide range of effects on the central nervous system, the metabolic system, and the immune system. For example, cortisol is involved in learning, metabolism of glucose, and regulation of inflammatory responses including anti-inflammatory actions (Birbaumer & Schmidt, 2010; Sapolsky, Romero, & Munck, 2000; Sandi, & Pinelo-Nava, 2007). A negative feedback system protects the body from an excessive, prolonged stress reaction (Anisman, 2016).

In sum, the physiological stress response is triggered to deal with a demand to the organism, namely acute stress. In individuals, GC levels increase to adapt to the demands and decrease after cessation of the stressor. As such, the stress response has an adaptive function. However, oftentimes an individual will experience not acute but chronic stress. In the next chapter, a

definition of chronic stress is given. Then, the biological mechanisms underlying chronic stress are presented, followed by a differentiation of stress types.

2.3 Mechanisms in Chronic Stress

Acute stress often results from a single event or stressor at a specific time point, and thus is temporary in nature (Lazarus, 1999). The primary function of an acute stress response is to mobilize energy reserves to deal with the stressor and to ensure the organism's survival through the process of allostasis. Therefore, the effects of acute stress are time-limited and adaptive. In contrast, stressors that are exceeding in severity or duration, or are inefficiently managed, can result in the experience of chronic stress (Pearlin, Menaghan, Lieberman, & Mullan, 1981). The perception of chronic stress is accompanied by repeated or prolonged activation of physiological systems involved in the stress reaction. Repeated cycles of allostasis cause a dysregulation of the biological systems, which lead to a wear and tear on the body and eventually, tissue damage and disease (McEwen, 2002, 2007). Physiological changes due to this dysregulation can be observed in both the neuroendocrine and immune system.

The neuroendocrine alterations in chronic stress include an elevation of GC levels. For example, cortisol levels were positively associated with self-reported psychological stress (Pruessner, Hellhammer, & Kirschbaum, 1999). Furthermore, chronic pain patients showed higher long-term cortisol levels in hair than the pain-free control participants (Van Uum, Sauvé, Fraser, Morley-Forster, Paul, & Koren, 2008). Other research, however, suggests that hypocortisolism appears to be involved in negative health states associated with chronic stress as well (Heim, Ehlert, & Hellhammer, 2000). In stress-related bodily disorders such as chronic fatigue syndrome or post-traumatic stress disorder, lower basal levels of salivary cortisol and reduced responsiveness to GCs have been reported (Heim et al., 2000; Raison & Miller, 2003). Similar results have been found for non-psychiatric individuals that experienced chronic stress due to caregiving of a sick relative (Miller, Cohen, & Ritchey, 2002). In their meta-analysis, Miller, Chen, and Zhou (2007) summarized the complex nature of the impact of chronic stress on the HPA axis. The variability in HPA axis functioning resulting in hyper- or hypocortisolism might be due to characteristics of the stressor or the person experiencing chronic stress (Miller et al., 2007). In particular, there appears to be a time-dependent pattern with elevated levels of glucocorticoids at the onset of chronic stress and lower levels of cortisol when the experience of stress continues.

Chronic stress has also been linked to a suppression of the immune system (Segerstrom & Miller, 2004). Chronic stress induces changes in the immune response by altering the balance

between Th1 and Th2 cytokines (Chiappelli, Manfrini, Franceschi, Cossarizza, & Black, 1994; Marshall, Agarwall, Lloyd, Cohen, Henniger, & Morris, 1998). As a consequence, an individual's susceptibility to disease increases (Miller et al., 2007; Selye, 1974). An experimental study by Cohen and colleagues (2012) further suggests that chronic stress results in GC receptor resistance. As a consequence, the body is unable to down-regulate inflammatory response, giving rise to decreased immune function.

Besides marked physiological alterations, chronic stress is accompanied by emotional and behavioral changes. Emotional signs of chronic stress include irritability, nervousness, or the feeling of being overwhelmed. Furthermore, an individual might alter their behavior in response to stress. Studies have confirmed that individuals experiencing chronic stress neglect protective behaviors (e.g., regular exercise or healthy diet) and instead show unhealthy or risky health behaviors (e.g., physical inactivity or smoking) (Cohen & Williamson, 1988; Cohen et al., 2007; Nyberg et al., 2013; Shaver, Johnston, Lentz, & Landis, 2002; Sinha, 2008). In the face of stress, a person might also change their social behavior. While in some individuals, an increase in affiliative behavior can be observed, others withdraw from their social interactions when they feel stressed (Taylor, 2009; Thompson & Goodvin, 2016). Social retreat would then diminish the consistently reported beneficial effects of social support in coping with stress (Taylor, 2009).

2.4 Types of Chronic Stress

Chronic stressors appear in different forms and occur in all life domains. Since most adults are employed and spend a large part of their day at work, much research has been done on occupational stress. Stressors at the workplace pose an increasing burden, mainly due to economic changes such as global competition (Siegrist & Wahrendorf, 2016). Murphy (1995) identifies five sources of workplace stressors:

- factors unique to the job (e.g., workload)
- role in the organization (e.g., role ambiguity)
- career development (e.g., job security)
- relationships at work (e.g., interpersonal conflicts)
- organizational structure/climate (e.g., management style)

This list shows that besides organizational stressors, psychosocial factors constitute major stressors at the workplace and are of relevance for an individual's well-being (Weiner, 1992; Siegrist, & Wahrendorf, 2016). As social beings, humans are particularly sensitive to threats to the self, such as threats to one's status or identity (Dickerson & Kemeny, 2004). Accordingly, socio-evaluative situations can trigger a stress response (Dickerson, Gruenewald, & Kemeny, 2009). Likewise, social relationships, apart from being a resource, can also pose a source of stress. Besides relationships at work, an individual's social environment is largely rooted in their family life. Even though time outside work is termed "leisure", for many individuals, family is a potential source of stress. This is particularly true in dual-earner households (Jacobs & Gerson, 2004). Family stressors include family obligations and demands, responsibilities, and role expectations (Cooke & Rousseau, 1984; Greenhaus & Singh, 2016). Nowadays, Western society expects fathers to be more engaged in the caregiving of their children (Henwood & Procter, 2003). Moreover, due to increased life expectancy, many employed individuals are involved in caregiving of their elderly parents (Durant & Christian, 2006). Due to these multiple role demands and major life changes, middle adulthood poses a particular challenge (Lachman, 2004).

Importantly, stressors of one domain consume resources, which then lack to deal with stressors from other domains (Hobfoll, 1989; Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964). Consequently, for individuals having obligations from both work and family, spillovers and conflicts in both domains can emerge (Greenhaus & Beutell, 1985; Joplin, Shaffer, Francesco, & Lau, 2003). In one survey with a nationally representative sample, fifty percent of employed fathers reported feeling stressed due to balancing responsibilities in both domains (Parker & Wang, 2013).

In short, chronic stress usually arises from psychosocial stress at work or home. This experience is accompanied by prolonged behavioral, emotional, and biological changes. These observations are also the groundwork for the different forms of assessing chronic stress, which will be summarized below.

2.5 Measurement of Chronic Stress

Due to the biological mechanisms involved in chronic stress, physiological measures such as hormone assessment from saliva or blood samples are often used to determine stress levels (Kirschbaum & Hellhammer, 1989; Spruill, 2010). Cortisol or alpha-amylase are commonly assessed as biomarkers of stress (e.g., Hellhammer, Wüst, & Kudielka, 2009; Yamaguchi et al.,

2006). Cortisol serves as an indicator of the functioning of the neuroendocrine system. However, when estimating baseline levels of stress hormones, their circadian rhythms need to be taken into account. Furthermore, hormone levels are very sensitive to external influences such as infections or sleep (Nicolson, 2008). Therefore, several samples over the course of several consecutive days should be collected and confounding variables need to be controlled for. Accordingly, this procedure is time consuming and cost intensive. Due to these reasons, hormone assessment from saliva is more suitable to measure acute stress levels. Newer approaches utilize hair or nail samples (Russell, Koren, Rieder, & Van Uum, 2012; Warnock et al., 2010). These methods enable researchers to observe cortisol concentrations over a longer period of time, and thus chronic stress levels.

However, as inconsistent results on the biological mechanisms in chronic stress have been reported (Miller et al., 2007), another line of research concentrates on the psychological component of chronic stress experience. According to the stress theory by Lazarus and Folkman (1984), stress is the result of a process between a person and their environment. However, this process is difficult to measure. Therefore, most instruments use stimulus or response-based approaches. One group of measures is targeted at assessing different types of stressors, such as major life events (e.g., Social Readjustment Rating Scale by Holmes & Rahe, 1967) or daily stressors (e.g., Daily Hassles and Uplifts Scale by Kanner, Coyne, Schaefer, & Lazarus, 1981). Deriving from the stimulus theory of stress, the quantity of events experienced by an individual should reflect their degree of chronic stress. Other questionnaires were designed to identify stress occurring in different domains such as marital stress (e.g., Marital Agendas Protocol by Notarius & Vanzetti, 1983) or work stress (e.g., Job Strain Questionnaire by Karasek & Theorell, 1990). The Trier Inventory for Chronic Stress (Schulz & Schlotz, 1999) is a comprehensive questionnaire that includes both stress from the social and work environment. Stress questionnaires differ in length, and thus expenditure of time for respondents. Visual analogue scales (VAS) constitute a more economic measure allowing the participant to give a subjective rating on a continuum, usually ranging from 0 to 100. Stress measures with a VAS correlate with stress measures from longer questionnaires such as the Perceived Stress Scale (Cohen, Kamarck, & Mermelstein, 1983; Lesage & Berjot, 2011). Nevertheless, single item measures lack a detailed assessment of the construct of interest.

In general, self-report measures are of great value as they provide a subjective view on an individual's experience of stress. However, several different factors need to be considered including their applicability and evaluation, social desirability bias, the possibility to compare the data across other studies and populations, and the availability of norm data if desired.

Therefore, the choice of an assessment method requires careful weighing with special regard to the research question at hand.

2.6 Summary

Not every person will respond to a given stressor with a stress response. According to transactional models, stress is the result of a cognitive appraisal process. Hence, an individual has an active role in the stress process. The experience of stress includes behavioral, emotional, and physiological changes. From a biological point of view, stress is a threat for an organism's homeostatic state, that is, its balance of physiological systems. In the face of stress, complex physiological mechanisms are activated until homeostasis is restored. Thus, evolution has formed an adaptive, self-regulating process called allostasis to deal with internal or external demands. However, over the last decades, individuals report an increase in their experience of chronic stress. The main sources of psychosocial stress lie within work and social relationships. Consequently, repeated or prolonged cycles of allostasis take place. Over time, the adaptive function of the physiological stress response diminishes, giving way for the damaging effects of chronic neuroendocrine activation. Therefore, the experience of chronic stress can have pronounced effects on an individual's health and well-being.

3. The Relationship between Perceived Chronic Stress and Mental Health

The effects of chronic stress can manifest as physiological and psychological strain (Chrousos, 2009). In order to offer a complete picture, the physical health consequences of chronic stress experience will be described briefly. However, the focus of the present thesis is on the consequences of stress for mental health, which will be presented afterwards.

3.1 Chronic Stress and Physical Health

Stress-related physiological health problems include cardiovascular diseases (e.g., hypertension), metabolic diseases, or cognitive impairment (Aggarwal et al., 2014; Andel, Crowe, Kareholt, Wastesson, & Parker, 2011; Chandola, Brunner, & Marmot, 2006; Chrousos, 2009; Kivimäki & Kawachi, 2015; Miller & Blackwell, 2006; Peavy et al., 2012; Richardson, Shaffer, Falzon, Krupka, Davidson, & Edmondson, 2012). Several of these negative health states have been investigated in relation to work stress and been summarized in meta-analyses. For example, a review of 27 studies from different countries found work stressors to be related to an increased risk of stroke and incident coronary heart disease (CHD; Kivimäki & Kawachi, 2015), as well as an elevated risk of work stress on recurrent CHD events (Li, Zhang, Loerbroks, Angerer, & Siegrist, 2015). Likewise, in individuals with high job insecurity, an increased risk for CHD was reported (Virtanen et al., 2013). Another meta-analysis showed a greater likelihood for obesity and diabetes in individuals reporting job strain (Nyberg et al., 2013). According to Kivimäki and colleagues (2013), the highest 10-year incidence for coronary artery disease were found in participants who reported a combination of job strain and an unhealthy lifestyle.

In a comprehensive review, Kiecolt-Glaser and Newton (2001) concluded that marital stress both directly and indirectly influences physical health, including cardiovascular and immunological mechanisms. Furthermore, conflict between work and family domains have been linked to various physical health outcomes, such as absence due to sickness, impaired sleep, or increased cardiovascular risk (Berkman, Buxton, Ertel, & Okechukwu, 2010; Clays, Kittel, Godin, Bacquer, & Backer, 2009; Lallukka, Rahkonen, Lahelma, & Arber, 2010).

3.2 Chronic Stress and Mental Health

As the emphasis of the present thesis is on mental health, in a first step, an attempt is made to provide a definition of mental health. Then follows a description of the measurement methods commonly used in research.

3.2.1 Definition of Mental Health

In the constitution of the WHO (1948), health is defined as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity." Their definition of *mental* health - as part of a more general concept of health - mentions the factors contributing to health in more detail. The WHO describes mental health as "a state of well-being, in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community" (WHO, 2014). This definition recognizes an individual's active role in work and society and in their coping with stress.

Since mental health constitutes a complex construct, it is often assessed using indicators such as subjective, psychological, or social well-being (Gallagher, Lopez, & Preacher, 2009). In a hedonic view, subjective well-being entails an individual's subjective evaluation about the quality of their lives (Diener, Suh, Lucas, & Smith 1999). It includes both positive and negative emotions as well as life satisfaction (Diener, Lucas, & Oishi, 2002) and can be generally referred to as "happiness" (Diener, 2000). As part of an eudaimonic tradition, Ryff (1989) introduced the more philosophical concept of psychological well-being. In her understanding, well-being is rather a state of optimal psychological functioning than happiness and is comprised of six factors such as positive relationships with others or personal growth. Keyes (1998) proposed social well-being as another indicator of mental health. It describes the degree of an individual's functioning in their social world. As such, social well-being is composed of five different dimensions such as social integration or social contribution.

The WHO definition points to mental health as a positive state of psychological well-being. In research, though, it is mostly conceptualized as lack of mental health or mental health problems. The most common mental health disorders or symptoms include affective disorders (e.g., depression), psychotic disorders (e.g., schizophrenia), or dementia (WHO, 2017).

The conceptualization of mental health also determines which assessment method needs to be used. The different measurements available are presented in the next chapter.

3.2.2 Measurement of Mental Health

As an approach to an objective assessment, mental health can be estimated using diagnostic criteria such as the Diagnostic and Statistical Manual of Mental Disorders (DSM, APA, 2013). The diagnosis is usually based on a (semi-)standardized interview with a clinical expert such as the Structured Clinical Interview for DSM-5 (First, Williams, Karg, & Spitzer, 2015). However, these methods are time-consuming and likely to elicit socially desirable response behavior due to their not being anonymous (Richman et al., 1999; Tourangeau & Yan, 2007). Furthermore, they are not designed for application in research with a large number of respondents.

Therefore, researchers often prefer to use self-reports for the assessment of subjective mental health problems. There are more general measures such as Ryff's Psychological Well-being Scales (Ryff & Keyes, 1995), the 36-item Short Form Survey to measure health-related quality of life (Ware & Sherbourne, 1992), or the Satisfaction with Life Scale (Diener, Emmons, Larsen, & Griffin, 1985). Most studies are usually interested in a specific mental health problem, and thus apply a corresponding questionnaire. Examples are the Beck Depression Inventory (Beck, Steer, & Brown, 1996) for the assessment of depression or the Generalized Anxiety Disorder Severity Scale (Shear, Belnap, Mazumdar, Houck, & Rollman, 2006) for symptoms of anxiety. For burnout, the leading instrument is the Maslach Burnout Inventory (Maslack, Jackson, & Leiter, 1996), while the related yet distinct concept of vital exhaustion can be assessed using the Maastricht Vital Exhaustion Questionnaire (MVEQ; Appels, Falger, & Schouten, 1993). Analogous to the assessment of chronic stress, VAS can be applied to determine participants' health and well-being. VAS is a valid measure for the assessment of anxiety or life satisfaction (Lucas & Donnellan, 2012; Williams, Morlock, & Feltner, 2010). As described in Chapter 2.5, advantages and disadvantages of self-report measures need to be considered before their use in practice and research.

3.2.3 Mental Health Consequences of Chronic Stress Experience

In a previous chapter, the consequences of stress for physical health have been described. However, the experience of chronic stress also takes its toll on an individual's mental health and well-being. Consistent findings indicate associations with mental ill-health such as anxiety or the onset and course of depression (Chrousos, 2009; Hammen, 2005). In an otherwise healthy sample, both stress at work and at home were positively linked to depressive and anxiety symptoms (Fan, Blumenthal, Watkins, & Sherwood, 2015). Other studies confirmed that work stress or job strain were independent risk factors for the development of a major depressive

episode (Bonde, 2008; Wang, 2005). In workers experiencing high job demands, the risk for major depressive disorder or generalized anxiety disorder was increased twofold (Melchior, Caspi, Milne, Danese, Poulton, & Moffitt, 2007). Regarding exhaustion states, work stress was significantly related to emotional exhaustion, burnout in general, and vital exhaustion (Chan, 2003; Qaiser, Gulzar, Hussain, & Shabbir, 2015; Schnorpfeil et al., 2002). In a representative nation-wide sample, job insecurity was an independent risk factor for impaired well-being (Kopp, Stauder, Purebl, Janszky, & Skrabski, 2008) and poorer self-rated health in several European countries (László et al., 2010). A review confirmed the predictive value of job strain, job insecurity, and psychological demands for the development of mental disorders (Stansfeld & Candy, 2006). In a diary study, social stress such as interpersonal conflicts were more strongly associated with emotional distress than nonsocial stressors (e.g., overload at work or financial problems) (Bolger, DeLongis, Kessler, & Schilling, 1989). Likewise, poor relationships at work were significantly associated with mental ill-health (Stansfeld & Candy, 2006). Moreover, chronic conflicts with others at work as well as low social support were positively related to vital exhaustion (Falger & Schouten, 1992; Noser, Fischer, Schoch, & Ehlert, submitted).

In sum, physical and mental health are severely affected by the experience of chronic stress due to work conditions as well as social relationships in general. Importantly though, the experience of stress depends on a person's interaction with their environment (Lazarus & Folkman, 1984). Accordingly, the likelihood of experiencing stress differs between individuals. Furthermore, studies report only small to moderate associations between stress and health (Code & Langan-Fox, 2001). Hence, not every person dealing with stress will go on to develop negative health states or illnesses (Spector, 2003). The pathways leading to the experience of chronic stress as well as those linking stress and strain are complex and include different influential factors (Cohen & Edwards, 1989). One critical variable to consider is an individual's personality (Ozer & Benet-Martínez, 2006). Therefore, the next chapter covers the theoretical mechanisms for the impact of personality on perceived stress and stress-related health consequences. Furthermore, empirical research regarding traditional personality traits is provided.

3.3 Individual Personality Differences Associated with Stress and Health

Even though personality is a major subject of psychological research, the various attempts to formulate a comprehensive definition highlight its complexity (Allport, 1959). According to Funder (2012, p. 5), personality can be defined as "an individual's characteristic patterns of

thought, emotion, and behavior, together with the psychological mechanisms – hidden or not – behind those patterns". Put short, personality is a relatively stable, individual way of thinking, feeling, and behaving. In his book on personality, Winter (1996) states that personality includes three elements: cognitions (e.g., values), motivation (e.g., motives), and traits (e.g., Big Five).

Personality appears to influence stress and strain through numerous pathways. Personality is involved in the whole stress process, starting from the exposure to stressors, their appraisal, and the response to stress (e.g., Anisman, 2016; Code & Langan-Fox, 2001; Payne, 1988). In literature, different theories and models exist describing similar processes (e.g., Bolger & Zuckerman, 1995; Code et al., 2001; Wiebe & Smith, 1997). In the following, the main theoretical models will be introduced.

According to the exposure model or selection hypothesis, individual differences in personality affect the exposure to stressors (Elovainio & Kivimäki, 2009). Individuals select and seek situations and stimuli based on aspects of their personality such as their values or cognitions (Brockner & Higgins, 2001). Consequently, certain individuals encounter stressors more frequently. For example, neuroticism has consistently been linked to higher exposure to stressors (Bolger & Zuckerman, 1995; Suls & Martin, 2005). Similarly, hostile persons are more exposed to stressors as their behavior induces more interpersonal conflict (Smith, Glazer, Ruiz, & Gallo, 2004). Moreover, personality characteristics may select individuals to environments that bear health risks (health behavior hypothesis; Miller et al., 1996). For example, individuals high in extraversion are more involved in risk behavior such as alcohol use (Cooper, Agocha, & Sheldon, 2000; Hong & Paunonen, 2009).

Personality may further affect an individuals' perception of his or her environment. Accordingly, personality differences influence the appraisal of a stressor in line with transactional models of stress (e.g., Lazarus & Folkman, 1984). Neurotic persons generally show more negative cognitive appraisal (Hemenover, 2001; Schallberger, 1995). In one study, caregivers had to rate the degree of impairment of their disabled spouses (Bookwala & Schulz, 1998). While their evaluation was uncorrelated with the objective impairment, their subjective rating was positively associated with their level of neuroticism. Neuroticism further showed positive associations with perceived stress levels and psychological distress (Abbasi, 2011; Ebstrup et al., 2011; van der Wal, Bucx, Hendriks, Scheffer, & Prins, 2016) For conscientiousness, a more positive pattern of cognitive appraisal has been found (Penley & Tomaka, 2002). Hence, these individuals will perceive less stress as they feel better prepared to deal with a stressor (Ebstrup et al., 2011).

With regard to the stress response, personality has an impact on coping as well as stress reactivity. Adaptive coping strategies protect an individual exposed to stress from its negative effects for health and well-being. More adaptive coping was present in extraverted and conscientious persons while the opposite was true for neuroticism (Connor-Smith & Flachsbart, 2007). Additionally, personality variables such as agreeableness influence one's social environment, for example by evoking supportive behavior, which in turn helps buffering stress-related consequences (Pierce, Lakey, Sarason, Sarason, & Joseph, 1997; Pincus & Ansell, 2003). Even more distinct are the correlations between extraversion and agreeableness and the perception of available support, which not necessarily corresponds to the actual available support (Allemand, Schaffhuser, & Martin, 2015; Swickert, 2009).

The reactivity hypothesis states that personality characteristics potentially increase susceptibility to consequences of stress experience, such as through an increase in emotional arousal (Cohen & Edwards, 1989; Lee & Ashforth, 1996; Miller, Smith, Turner, Guijarro, & Hallet, 1996; Wiebe & Smith, 1997). For example, individuals high in neuroticism showed greater negative affect upon the experience of stress (Bolger & Zuckerman, 1995; Mroczek & Almeida, 2004). Accordingly, high levels of neuroticism and negative affectivity were found to increase the adverse effect of stress on well-being (Mroczek & Almeida, 2004; Parkes, 1990). Similarly, when individuals were low in extraversion, a stronger association between relationship conflict and lower well-being was observed (Dijkstra, van Dierendonck, Evers, & De Dreu, 2005). Nevertheless, personality traits potentially attenuate the impact of stress exposure on strain. For example, dispositional optimism was shown to buffer the negative influence of stress on mental health (Lai, 2009; Mäkikangas & Kinnunen, 2003; Thomas, Britt, Odle-Dusseau, & Bliese, 2011). Likewise, high emotional intelligence dampened the negative effect of work stress on emotional exhaustion (Görgens-Ekermans & Brand, 2012).

Personality further influences an individual's vulnerability to disease by determining the physiological stress reactivity. Both hostility and type A behavior are linked to greater increases in blood pressure and heart rate in response to stress (Contrada & Krantz, 1988; Suarez, Kuhn, Schanberg, Williams, & Zimmerman, 1998). Similarly, high perfectionism predicted stronger cortisol increases after experimentally induced social stress (Wirtz, Elsenbruch, Emini, Rudisuli, Groessbauer, & Ehlert, 2007).

In conclusion, personality contributes to the exposure and perception of stress, as well as the corresponding reactions including stress-related health states. From a methodological perspective, personality can either directly or indirectly influence stress and health as an

independent variable, or serve as a moderator of the relationship between stress and health (Grant & Langan-Fox, 2006).

3.4 Summary

The experience of chronic stress has a far-reaching impact on a person's mental and physical health. Potential stress-related consequences include metabolic and cardiovascular diseases, depression, impaired well-being, and exhaustion. Nevertheless, large inter-individual differences in the psychobiological stress response exist. Consequently, some individuals might be more prone to develop negative health states when experiencing chronic stress. Individual differences in personality are important contributors in the stress-strain relationship. Their influence can be observed in all stages of the stress process. Findings confirm that traditional personality traits such as the Big Five are involved in exposure to stressors, perception of stress, and stress response. However, the role of motivational characteristics of personality is less clear and deserves more profound research.

4. The Role of Implicit Motives for Health and Well-being

Research on implicit motives had its beginnings in the 20th century (Schultheiss & Brunstein, 2010). Despite decades of research, the role of implicit motives in the experience of stress and stress-related well-being remains yet to be fully discovered. This chapter introduces the basic concept of motivation before moving on to the nature of implicit motives. For each motive, a definition and an overview of their behavioral correlates will be provided. Then, empirical evidence for associations between implicit motives and health are presented. The chapter concludes with the description of the particular method used to assess implicit motives in the present thesis.

4.1 Motivational System of Personality

The primary goal of our motivational system is to ensure our survival. It constantly evaluates our environment in an effort to recognize and avoid threats and to seek rewarding and beneficial stimuli (Sachse, Püschel, Fasbender, & Breil, 2008). The word motivation derives from the Latin verb *movere*, meaning "move or drive". Motives determine our thoughts, feelings, and actions (Heckhausen & Heckhausen, 2010; McClelland, 1985). Therefore, human motives have been called the driving force of behavior and are essential for explaining individual differences in our well-being and behavior (McClelland, Atkinson, Clark, & Lowell, 1953).

Traditionally, motives were assessed by self-report questionnaires or projective measures. However, the motive measures derived from these different methods were found to be statistically independent (deCharms, Morrison, Reitman, & McClelland, 1955; Schultheiss, Yankova, Dirlikov, & Schad, 2009; Spangler, 1992). Hence, the existence of two independent motivational systems was suggested, called implicit and explicit motives (McClelland, Koestner, & Weinberg, 1989). Explicit motives are self-attributed goals and values. They have been verbally learned and are based on explicit information, indicating the need for sufficient cognitive resources for their development (Thrash, Maruskin, & Martin, 2012). Furthermore, they are shaped by social norms and an individual's self-concept. They predict immediate responses to a situation as well as conscious choices and decisions (McClelland, 1980). Since explicit motives are consciously available to the person, they can be assessed through self-reports such as the Personality Research Form (Jackson, 1984). In contrast, implicit motives largely operate outside an individual's awareness (McClelland et al., 1989). Below, the concept of implicit motives is described in more detail.

4.2 Definition of Implicit Motives

Implicit motives are relatively stable motive dispositions and constitute an important part of the human motivational system (McClelland, 1987). In the early drive-reduction theory (Hull, 1943), behavior was believed to be motivated by the restoration of physiological homeostasis by meeting biological needs such as thirst or sleep. However, this concept falls short of explaining all human behavior. Newer approaches emphasize the role of incentives. Implicit motives are automatically aroused in response to nonverbal incentives without conscious efforts (McClelland et al., 1989; Schultheiss, Rösch, Rawolle, Kordik, & Graham, 2010). Motives further drive our attention towards certain incentives as they provide opportunities to satisfy our motivational need (Bolles, 1972; McClelland et al., 1953). When we are able to show a certain behavior in order to achieve motive satisfaction, we experience intrinsic pleasure (Brunstein, 2006). In contrast, motive frustration will lead to negative affect.

Research concentrated on three motivational domains, called the "big three": affiliation, achievement, and power (McClelland, 1985). Implicit motives are not unitary but can be expressed in two different orientations, depending on whether a motivational incentive is being attained (hope or approach orientation) or a motivational disincentive is being avoided (fear or avoidance orientation) (Atkinson, 1958; McClelland, Atkinson, Clark, & Lowell, 1953; Schultheiss, 2008; Winter, 1973). Since these social motives are present in many mammal and non-mammalian species, they are believed to have developed for evolutionary reasons (Baumeister & Leary, 1995; Buss, 2001). Accordingly, the motivational system has a biological basis including endocrine and sympathetic pathways (Schultheiss, 2008). While the existence of these motives is biologically determined, their individual manifestation is shaped in the preverbal phase of childhood through emotional experiences from interactions with parents or other important caregivers (McClelland, 1987; Thrash et al., 2012). According to McClelland and colleagues (1953), implicit motives are developed by pairing cues with affective arousal. Incentives that have repeatedly been paired with the experience of positive affect will be looked for and approached more often in the future (McClelland, 1987). At the same time, individuals will avoid incentives that they have learned to be followed by negative affect. Therefore, the affect inherent in certain experiences is the key to implicit motivation and behavior (Schultheiss, 2008). Specifically, implicit motives are predictors of self-initiated, spontaneous as well as long-term behavior (McClelland et al., 1989; Schultheiss et al., 2010; Spangler, 1992).

In the following, definitions of each social motive are given. Furthermore, findings from studies on behavioral correlates of implicit motives are reported.

4.2.1 Affiliation

The implicit need for affiliation (*n*Affiliation) is defined as a concern with establishment, maintenance, or restoration of positive interpersonal relationships (Atkinson, Heyns, & Veroff, 1958). From an evolutionary perspective, the need for affiliation ensures reproductive success and survival. Bonding with others and forming social networks provided substantial benefits, such as protection from outside dangers, sharing food and resources, as well as caring for offspring (Ainsworth, 1989; Hall, Stanton, & Schultheiss, 2010).

In an approach orientation, *n*Affiliation is expressed as *hope for closeness*. Accordingly, affiliation-motivated individuals seek warm, close social relations. However, in an earlier study, the mother's ignorance in response to her crying infant was the best predictor of the strength of the affiliation motive in adult age (McClelland et al., 1989). Consequently, individuals motivated for affiliation can also be characterized by their *fear of rejection* and therefore, also avoid situations, in which social rejection could be experienced. Therefore, individuals high in affiliation are overly concerned about the impression they make on others (Exline, 1960). Moreover, they are concerned about not hurting other people's feelings and might change their behavior in interpersonal situations, such as making concessions, in order to achieve or maintain a peaceful and affiliative relationship (Langner & Winter, 2001; Walker & Heyns, 1962; Weinberger, Cotler, & Fishman, 2010). Hence, affiliation motivation can be maladaptive when an individual's behavior is largely driven by the need to avoid interpersonal conflict (Exline, 1962; Zurbriggen, 2000).

Earlier researchers have distinguished the need for affiliation and the need for intimacy (McAdams, 1980). The latter differentiates from *n*Affiliation by its strong preference for dyadic relations as opposed to social groups. In a study by McAdams and Constantian (1983), individuals who had a strong need for intimacy or affiliation reported thinking more about and wishing to be interacting with others. Accordingly, they also showed more affiliative behavior such as making phone calls, writing letters, or paying visits to friends (Lansing & Heyns, 1959; McAdams & Constantian, 1983). When interacting in a positive social situation, they also smiled more frequently at their counterpart (McAdams, Jackson, & Kirshnit, 1984). Likewise, the motive for affiliation was linked to more amicable nonverbal behavior towards the opponent in sport competitions (Wegner, Bohnacker, Memple, Teubel, & Schüler 2014).

Furthermore, intimacy motivation was a significant long-term predictor of an individual's psychosocial adjustment (McAdams & Vaillant, 1982). In particular, intimacy motivation at the age of 30 was positively associated with higher income as well as more enjoyment of one's job and marriage seventeen years later. McAdams and colleagues (1986) found the intimacy motive to be associated with generativity, the concern to establish and guide the upcoming generation (Erikson, 1963). Higher intimacy motivation resulted in a greater amount of generative content in texts, in which participants wrote about their future. Similarly, women's but not men's need for intimacy-affiliation was positively correlated with the number of children they had (Peterson & Stewart, 1993). Affiliation also extends to the well-being of others. For example, when leaders had a higher motive for affiliation, they were more concerned with the needs of their followers as rated by their employees (Steinmann, Ötting, & Maier, 2016).

However, studies also report findings supporting the duality of affiliation (Weinberger, Cotler, & Fishman, 2010). An experimental study investigated the activity of the corrugator supercilii, a muscle signaling negative affect (Bradley, Codispoti, Cuthbert, & Lang, 2001). In participants high in implicit affiliation, their corrugator activity increased in response to an experimenter keeping a neutral facial expression (Kordik, Eska, & Schultheiss, 2012). However, this reaction did not occur when the experimenter smiled during the interaction. The authors argued that a neutral face would be more stressful for an individual high in affiliation because it indicated a lack of involvement in the interaction. Moreover, feeling less related to others was associated with higher social cynicism in individuals with a strong need for affiliation-intimacy (Hofer, Busch, Schneider, Solcova, & Tavel, 2015). Accordingly, the motive for affiliation is sensitive to rejection as shown by individuals high in *n*Affiliation distancing themselves from a person by avoiding eye contact or expressing greater dislike (Byrne, 1961; Exline, 1963).

4.2.2 Achievement

The implicit motive for achievement (*n*Achievement) is characterized by the preference for attaining a standard of excellence and improving one's performance (Atkinson & Feather, 1966; McClelland, Atkinson, Clark, & Lowell, 1953). According to McClelland (1985), the strength of implicit achievement is shaped by parents emphasizing independence in the upbringing of their children. Furthermore, it is influenced by the response of important caregivers to the child's mastering or failing at tasks (McClelland & Pilon, 1983). Achievement motivation can be distinguished in the components *hope for success* and *fear of failure* (Pang, 2010). On the

one hand, individuals high in achievement engage in a task because they anticipate success and the experience of positive feelings. On the other hand, they show increased engagement due to a more anxiety-driven orientation since failing at a task would result in an aversive, negative emotional state. Electromyography revealed that individuals high in *n*Achievement showed greater corrugator activity in response to negative performance feedback compared to those low in implicit achievement (Kordik, 2011). In a re-analysis of unpublished data (Hall, Stanton, & Schultheiss, 2010), participants strongly motivated for achievement showed greater activation in the core motivational brain circuit when exposed to angry faces in the scanner as opposed to neutral faces. Moreover, they directed their attention away from surprised or angry facial expressions towards joyful faces. Arguably, achievement motivated individuals are sensitive for negative social cues since they prevent them from mastering challenges and achieving success. Therefore, they show approach-oriented behavior (Hall et al., 2010).

The implicit motive for achievement is usually studied in association with an individual's performance. For example, participants with high *n*Achievement showed better performance in an anagram word puzzle (deCharms et al., 1955; McClelland et al., 1953) or performed faster in an attention test (Kordik, 2011). More interestingly, though, is the consistent finding that individuals' strength of implicit achievement motivation is linked to the degree of effort they put in completing a task or exercise (Biernat, 1989; Brunstein & Hoyer, 2002; Dahme, Jungnickel, & Rathje, 1993). The need for achievement was responsible for repeatedly performing in a tournament (Wegner & Teubel, 2014) or the amount of time athletes spent on court (Wegner & Schüler, 2014). In an experimental study, participants high in implicit achievement compared to those low in *n*Achievement scored better on a Stroop task after having mastered a frustrating task (Gröpel & Kehr, 2014). However, those high in *n*Achievement prefer challenges with a moderate difficulty level, probably because they offer the best chances for experiencing success (Schultheiss & Brunstein, 2005). Individuals motivated for achievement also seek feedback to accurately evaluate and improve their performance (Brunstein & Maier, 2005; Fodor & Carver, 2000). However, they prefer feedback on an individual level rather than in comparison to others (Brunstein & Maier, 2005).

Due to the intense efforts they put into mastering challenges, individuals high in *n*Achievement also seem to be more successful. Regarding socioeconomic status, implicit achievement measured at age 31 was a significant predictor of an individual's annual income ten years later (McClelland & Franz, 1992). Furthermore, employees' need for achievement was directly associated with job performance (Baruch, O'Creevy, Hind, & Vigoda-Gadot, 2004). In two studies in the United States and India, *n*Achievement was found to significantly

predict entrepreneurial activity and success (McClelland, 1965; McClelland, 1987). A meta-analysis has supported the positive relationship between implicit achievement and entrepreneurs' behavior (Collins, Hanges, & Locke, 2004). However, leaders with a very strong motive for achievement ignore certain leadership tasks because they prefer to achieve success through their own efforts rather than delegating responsibilities (House & Aditya, 1997; Spangler, Tikhomirov, Sotak, & Palrecha, 2014). Accordingly, they are not as suitable for managerial positions or in jobs that call for social skills (McClelland & Boyatzis, 1982). Other studies provided further evidence for the drawbacks of high *n*Achievement such as lower effectiveness or using questionable methods to improve performance or be successful (Editorial, 1999; Johnson, 1999; House, Spangler, & Woycke, 1991).

4.2.3 Power

The implicit power motive (*n*Power) is the need to have impact on other people in an emotional, mental, or physical way (McClelland, 1975; Schultheiss, 2008). Furthermore, these individuals are concerned with having control or high status. From an evolutionary point of view, having power was essential for survival since it offered access to better resources as well as more potential partners to ensure the next generation (Hall et al., 2010; Wilson, 1980). Individuals high in *n*Power experience positive feelings and reward from having influence on others, which characterizes the approach orientation *hope for power*. Due to the avoidant component *fear of weakness*, it is aversive to individuals with a strong concern for power to be influenced or controlled by others (Veroff, 1982; Winter, 1992). The strength of implicit power depends on the way parents reacted when their child experienced having impact on something or someone (McClelland, 1987). If the child is reinforced in his behavior and experiences positive affect in such situations, his or her power motive will be strengthened. However, McClelland and Pillon (1983) also found that a parenting style of permissiveness for sex and aggression was a significant positive predictor of implicit power motivation in adulthood.

Earlier studies have investigated *n*Power extensively. For example, they reported that the need for power was positively related to office holding (McClelland, 1975; Stewart, 1975; Winter, 1973; Winter & Stewart, 1978). A high motive for power was also associated with female students putting their names on their dorm room doors in order to increase their visibility to others (Winter, 1973). Their male counterparts' need for implicit power was correlated with the number of prestigious objects they possessed (e.g., television set) (Winter, 1973). Individuals with a pronounced need for power are perceived as being more competent and convincing and

are more successful managers (McClelland & Boyatzis, 1982; McClelland & Burnham, 1976; Schultheiss & Brunstein, 2002). In a longitudinal study, the strength of *n*Power in college predicted pursuing a power-related career ten years later (Stewart, 1975).

However, several studies have reported associations of implicit power with more profligate behavior. Implicit power was a significant predictor of drinking alcohol, risk-taking in gambling, making autocratic business decisions, and being aggressive (Fodor & Smith, 1982; McClelland, Davis, Kalin & Wanner, 1972; McClelland & Teague, 1975; McClelland & Watson, 1973; Winter, 1988). In a money distribution task, participants with a strong power motive were less likely to share the money with a virtual player but allocate more money to themselves (Quirin, Beckenkamp, & Kuhl, 2009). Furthermore, *n*Power correlated with the frequency of sexual intercourse and with stronger endorsement of casual sex in men (Schultheiss, Dargel, & Rohde, 2003b; Yost & Zurbriggen, 2006). In general, high power motivation seems to be detrimental for intimate relationships (Stewart & Rubin, 1976; Winter, Stewart & McClelland, 1977). For instance, individuals with a high need for power are less satisfied with their relationship and more likely to get divorced (McClelland et al., 1972; Stewart & Rubin, 1976). Moreover, men high in implicit power were more likely to physically abuse their partner, while physical violence was unrelated to women's need for power (Mason & Blankenship, 1987). Analyses of American presidents' inauguration speeches revealed that the strength of implicit power derived from these verbal samples was linked to the presidents going to war with another country later in their term (Winter, 1987).

In another line of research, *n*Power was investigated in experimental studies. Implicit power motivation was found to be a significant predictor of enhanced learning in a task after participants had previously won in a contest (Schultheiss et al., 2005a). Among losers, the need for power was associated with impaired learning. When individuals with high *n*Power were confronted with a facial expression showing high dominance and anger, they showed more attentional avoidance since a loss of power is aversive to them (Schultheiss & Hale, 2007). Furthermore, their performance on an instrumental learning task after the picture cues was impaired (Schultheiss, Pang, Torges, Wirth, Treynor, & Derryberry, 2005). They more often drew their attention towards faces showing surprise, which indicated low threat of dominance, and consequently performed better in the instrumental learning task (Schultheiss et al., 2005b). Fodor and Wick (2009) investigated participants' corrugator activity during a speech that they had to deliver to an audience whose reaction was experimentally manipulated to be either positive or negative. In front of an unappreciative audience, participants with a high need for

power showed more corrugator activity, indicating more negative affect since their need for power was frustrated in that situation.

Besides a more profligate manifestation of implicit power motivation, there is evidence that *n*Power can be realized in a more socialized form, called prosocial power (Chasiotis & Hofer, in press; McClelland, 1975; Winter, 1973). Winter (1988) suggested that the different manifestations of implicit power are the result of different socialization processes in childhood. Presumably, prosocial power develops through socialization, such as taking care of younger siblings (Winter, 1988). Moreover, it is assumed that the type of power a person realizes depends on his or her degree of activity inhibition (AI). AI is a form of impulse control and represents the degree to which motivational impulses can be inhibited (McClelland et al., 1972). High *n*Power in combination with high AI should result in more prosocial behavior whereas low AI fosters a more profligate, aggressive expression of power (Schultheiss, 2008). Prosocial power can be satisfied through prosocial behavior such as teaching (McClelland, 1975). In a study by Peterson and Stewart (1993), a woman's motive for power was linked to the number of children she had and how involved she was with them. Moreover, an individual's prosocial power was positively associated to his or her explicit love for children (Chasiotis, Hofer, & Campos, 2006). Similarly, a higher implicit prosocial power motive was related to more generative concern (Hofer, Busch, Chasiotis, Kärtner, & Campos, 2008).

4.3 Associations of Implicit Motives with Stress and Health

From the early beginnings of the study on implicit motivation, researchers were interested in the consequences of motive strength for an individual's health and well-being. Due to their evolutionary basis and because many mammalian and also non-mammalian species share certain social motives, researchers assume underlying biological pathways. Furthermore, since our implicit motives co-determine our thoughts, emotions, and behavior, they are likely to play a crucial role in health.

4.3.1 Affiliation and Stress and Health

In general, affiliation appears to be related to better physical health. In a sample of male prisoners, those who were higher in *n*Affiliation reported suffering from fewer illnesses compared to men low in implicit affiliation (McClelland et al., 1982). Similar results were obtained in other studies (Jemmott et al., 1983; McClelland & Jemmott, 1980). McClelland

(1979) found that men's implicit motive for affiliation at the age of 30 significantly predicted lower diastolic and systolic blood pressure twenty years later.

According to Jemmott (1987), implicit affiliation decreases the susceptibility to disease, particularly through the immune system. For example, college students' degree of affiliation was positively associated with activity of their natural killer cells (NKCA), which are part of the innate immune system (Jemmott et al., 1990). Higher *n*Affiliation was also related to higher levels of secretory Immunoglobulin A (sIgA), which is an important antibody involved in the defense against pathogenic agents (Jemmott, 1987; Woof & Kerr, 2006). Moreover, evidence was found for the influence of stressful circumstances in this relationship. During high-stress periods, the link between affiliation and sIgA was stronger, indicating enhanced immune function (Jemmott, 1987). Jemmott and colleagues (1983) compared the effect of exam stress on immune function in individuals high vs. low in affiliation. In all students, sIgA secretion rates decreased in high-stress periods compared to baseline and exam-free periods. However, students with a high motive for affiliation showed higher levels of sIgA throughout the investigation period. In another study, students with a high need for affiliation did not respond with decreased sIgA concentrations to their midterm exams either (McClelland et al., 1987). Therefore, it is suggested that implicit affiliation has beneficial effects on the immune system (Jemmott et al., 1983). This assumption was tested in two experimental studies. Participants' sIgA levels were measured before and after they watched a movie about Mother Teresa that demonstrably aroused *n*Affiliation (McClelland & Kirshnit, 1988). Results showed a significant increase in sIgA in response to affiliation arousal.

In general, the need for intimacy is positively related to happiness (McAdams & Bryant, 1987). However, this only held true when women were able to satisfy this need. Living alone resulted in more uncertainty and lower gratification in these women (McAdams & Bryant, 1987). Wirth and Schultheiss (2006) had participants watch a movie targeted at the *fear of rejection* component of affiliation. They observed an increase in both cortisol and progesterone levels after the movie compared to baseline. The cortisol response points to the fact that rejection was experienced as stressful by the participants, similar to a result reported above (Kordik et al., 2012). The increase in progesterone gives an indication for the mechanism behind the beneficial health effects of *n*Affiliation. Progesterone is a steroid hormone that has sedative and anxiolytic effects on the brain (Söderpalm, Lindsey, Purdy, Hauger, & de Wit, 2004; Wieland, Lan, Mirasedeghi, & Gee, 1991). Therefore, progesterone downregulates the activity of the HPA axis (Wirth, 2011). In the face of threat, some individuals show so called tend-and-befriend behavior as opposed to a fight-or-flight reaction (Caporeal, 1997; Gump & Kulik, 1997; Schachter, 1959). The release of progesterone during the stress response promotes

the increase of affiliative behavior to help adjust to the stressor (Childs, van Dam, & de Wit, 2010; Herrera, Nielsen, & Mather, 2016; Taylor et al., 2000; Wirth, 2011). In line with this observation, studies consistently reported associations between progesterone and implicit affiliation (Schultheiss et al., 2003; Schultheiss, Wirth, & Stanton, 2004). Further support for the stress-buffering effect of implicit affiliation is provided by an experimental study conducted by Wegner, Schüler, and Budde (2014). Participants were either in a control group or exposed to one of two stressors. The control group received a standard lesson from a teacher for 15 minutes. In the physical stress condition, participants were asked to run for fifteen minutes at a moderate exercise intensity. In the psychosocial stress group, participants worked for the same amount of time on an intelligence test. Previously, they had been told that their IQ score would be publicly announced in front of other students and the experimenter. Salivary cortisol was assessed before and after the stressor. Participant's need for affiliation significantly predicted lower cortisol response to the acute psychosocial stressor. No influence of *n*Affiliation in the physical stress condition or control group was found. According to the authors, the psychosocial stress was not experienced as threatening in individuals with a strong motive for affiliation (Wegner et al., 2014). Therefore, implicit affiliation has the potential to buffer the biological stress reaction in motive-relevant situations.

4.3.2 Achievement and Stress and Health

In comparison to research on implicit affiliation and power, findings on health correlates of *n*Achievement are still rare. First results give rise to the assumption that particularly low achievement is involved in psychological disease. For example, opiate users had significantly lower implicit achievement motivation compared to a control group (Bársonya, Martos, Ehmann, Balázs, & Demetrovics, 2013). Similarly, patients with depressive symptoms or major depression had significantly lower scores in implicit achievement than controls (Musty & Kaback, 1995; Neumann & Schultheiss, 2015).

Little is also known about biological mechanisms involved in achievement (Schultheiss, 2008). Research on the role of the hormone arginine vasopressin in implicit achievement is still in its early stages (McClelland, 1995). Considering the current sparse research situation, Hall and colleagues (2010) argued that in contrast to affiliation and power, the social motive for achievement might not be as universal across all species. Therefore, it would also lack consistent hormonal or neural underpinnings. Nevertheless, three studies found evidence for the effect of *n*Achievement on cortisol response in experimental tasks. Implicit achievement predicted dampened cortisol reactivity after a dominance contest as well as in response to a

social stressor but not in a control condition (Kirschbaum, Pirke, & Hellhammer, 1993; Schultheiss, Wiemers, & Wolf, 2014). The results indicate better regulation of the stress reaction in achievement motivated individuals. Another study investigated the role of feedback in this relationship (Yang, Ramsay, Schultheiss, & Pang, 2015). When participants high in achievement received a positive feedback or no feedback in an achievement task, their cortisol response was increased. However, in response to negative feedback, these individuals showed a dampened cortisol reaction.

In conclusion, individuals with a strong need for achievement appraise certain situations differently from others. Negative feedback on a task is viewed as a challenge, which has the potential for success and reward, and thus is not experienced as stressful. Additionally, there is first evidence for better physiological stress regulation in implicit achievement motivation.

4.3.3 Power and Stress and Health

Implicit power motivation has consistently been associated with greater activation of the SNS (Hall et al., 2010). Steele (1973) reported that increases in thoughts related to power were followed by increased SNS activity as indicated by elevated epinephrine excretion rates. Based on his research, McClelland (1979) argued that the chronic activation of the SNS in power-motivated individuals was due to their need for power being threatened, either by inhibition or stress. He coined the terms *inhibited* or *stressed* power motivation. Implicit power significantly predicted high blood pressure over time when combined with high life stress (McCelland, 1979). Other researchers observed elevated levels of norepinephrine in high power students undergoing an exam (McClelland, Ross, & Patel, 1985). When individuals with a strong need for power are exposed to mild laboratory stress, they also showed greater release of epinephrine (McClelland, Davidson, Saron, & Floor, 1980). Moreover, stressed power motivation is also linked to worse immune function as indicated by lower concentrations of sIgA and NKCA (Jemmott & McClelland, 1988; Jemmott et al., 1990; McClelland, 1989). Compared to other male inmates, those with high *n*Power and high stress not only had the lowest sIgA levels, they also reported more frequent and severe illnesses (McClelland, Alexander, & Marks, 1982). Similarly, college students characterized by high scores in *n*Power, inhibition and power stress, described more affective symptoms and severe physical illness than the other participants (McClelland & Jemmott, 1980). In a newer study, Neumann and Schultheiss (2015) found that participants with a clinical depression also had lower levels of implicit power motivation compared to a non-depressed control group.

Due to the relationship between *n*Power and dominant behaviors (see chapter 4.2.3), researchers assumed that the hormone testosterone might be the underlying biological pathway (Schultheiss, 2007). Indeed, baseline levels of testosterone are positively associated with implicit power in men and women (Schultheiss, 2007; Schultheiss, Dargel, & Rohde, 2003a). The mere anticipation of succeeding in a dominance challenge led to increases in testosterone in men motivated for power (Schultheiss, Campbell, & McClelland, 1999). Several studies have experimentally manipulated the outcome of dominance contests and studied the influence of implicit power motivation on testosterone levels and subjective well-being. When participants won the contest, their implicit need for power predicted testosterone increases (Schultheiss & Rohde, 2002; Schultheiss, Wirth, Torges, Pang, Villacorta, & Welsh, 2005). However, having lost the contests, *n*Power predicted decreases in testosterone levels. A similar study found that the experience of stress did not particularly depend on winning or losing a contest but was influenced by the strength of an individual's implicit motive (Wirth, Welsh, & Schultheiss, 2006). The authors found that high implicit power predicted increased post-cortisol levels when participants were defeated in the contest. However, when their motive for power was low, increases in cortisol levels were only found among winners of the contest. Therefore, social defeat is particularly stressful for individuals with a strong concern for power.

4.4 Assessment of Implicit Motives

As outlined before, individuals do not have access to their implicit motives because of their non-conscious representation (McClelland et al., 1953). In consequence, the use of self-report methods is not eligible for the assessment of implicit motives. Instead, researchers have developed methods to measure implicit motives indirectly. In particular, participants write fantasy stories in response to ambiguous pictures, which are then analyzed through thematic content coding. Importantly, participants are asked to describe the characters in the picture and not themselves (Brunstein & Maier, 2005). The underlying assumption is that the picture cues arouse implicit motives, which influence the interpretation of the depicted situations. Implicit motives can then be detected in the characters' feelings, thoughts, and behavior described in the stories.

The three most commonly used content coding methods are the Picture Story Exercise (PSE; Schultheiss & Pang, 2007), the Multi-Motive Grid (Sokolowski et al., 2000), and the Operant Motive Test (OMT; Kuhl & Scheffer, 1999). The advantages and limitations of the different methods are discussed in detail elsewhere (Schüler, Brandstätter, Wegner, & Baumann, 2015). In the empirical research papers integrated in the present thesis, the PSE was

the assessment method of choice. It is based on the Thematic Apperception Test (Morgan & Murray, 1935) and was developed through empirical verification procedures (Fodor, 2010; Winter, 1999). The PSE has an open response format and has been shown to assess operant behavior, and consequently the strength of the implicit motives (McClelland, 1980). Furthermore, the meta-analysis by Schultheiss and Pang (2007) has shown strong empirical evidence for the PSE's validity as well as retest and inter-scorer reliability (Schultheiss & Pang, 2007). The participants are given the instructions to write a complete story to each picture with focusing on the characters' feelings, thoughts, and wishes. The full instructions according to Schultheiss and Pang (2007) as well as the six most commonly used picture cues of the PSE are available in the appendix.

The stories derived from the picture cues are analyzed for motive imagery according to Winter's (1994, p. 4) psychometrically validated scoring system. Motive imagery is defined as "an action (past, present, future, or hypothetical), a wish or concern, or some other internal state, which any speaker (…) attributes to self, to some other person, to a group or institution (…), or to people in general." The only exception is when motive images are negated, restrained, or denied. Motive images are scored based on the actual text with only minimum intuition or inferences (Winter, 1994). All three motives are scored simultaneously according to the specific rules described below.

Affiliation is scored whenever a character or group (including institution or country) expresses a wish to maintain or restore friendly relations or friendships. The scoring system considers four different forms of affiliation imagery:

1. Expression of positive, friendly or intimate feelings toward others,
2. Sadness or other negative feeling about separation or disruption of a friendly relationship, or wanting to restore it,
3. Affiliative, companionate activities,
4. Friendly nurturing acts among equals.

Achievement is scored when a character or group is concerned with a standard of excellence:

1. Adjectives that positively evaluate performances,
2. Goals or performances that are positively evaluated,
3. Winning or competing with others (except if it's achieved through pure aggression or power),

4. Failure, bad performance, or other lack of excellence that is negatively evaluated,
5. Unique accomplishment.

Power is scored at the mention of having impact, control, or influence on others. These effects can be physical, mental, or emotional in nature. The power motive can be expressed in the following six forms:

1. Strong, forceful actions, which have impact on others,
2. Control or regulation,
3. Attempts to influence, persuade, or convince,
4. Giving help, advice, or support that is not explicitly solicited,
5. Impressing others; mention of (or concern about) fame, prestige, or reputation,
6. Strong emotional reaction in one person to the intentional action of another person.

The scores for each subcategory within a motive domain are summed up with higher scores indicating a higher motivational need. Before coding actual stories, each coder receives an intense coder training and should have several hours of scoring practice materials until a high level of reliability is achieved (Schultheiss & Pang, 2007).

4.5 Summary

The motives for affiliation, achievement, and power have been evolutionary formed and are a universal part of human existence. They represent the need for positive affective experiences that arise from specific classes of incentives we experience as rewarding. As such, they drive behavior through an expected change in affect. The emotional arousal associated with the frustration or gratification of a motive is accompanied by physiological mechanisms. Accordingly, implicit motives are involved in behavior and health processes. Previous findings show that affiliation may have beneficial effects on health while implicit power is linked to sympathetic activity and adverse health states. Regarding achievement, first results indicate better physiological stress regulation. Experimental studies further show that the interaction of motives with motive-relevant stressors is essential in the prediction of subsequent strain (Code & Langan-Fox, 2001). So far, research has concentrated on behavioral and physiological correlates of implicit motives. Findings on psychological aspects such as chronic stress perception and mental health in association with implicit motives are rare.

5. Conclusions, Aims, and Research Questions

Global changes in economy and society have led to a challenging environment. An increasing number of individuals experience chronic stress from factors related to work or social relationships. Men are particularly affected as they are the primary breadwinners in many families. Work-family conflicts, such as when the obligations associated with fatherhood interfere with those at the workplace, pose another source of stress. Chronic stress and its associated emotional, behavioral, and biological changes have been identified as risk factors for reduced well-being and for the development of adverse health states. Therefore, the prevention and treatment of chronic stress constitutes a major priority. It is necessary to understand both the mechanisms leading to the experience of stress as well as the pathways linking chronic stress to negative health outcomes. For one thing, the type of stress appears to be of relevance (Michaud, Matheson, Kelly, & Anisman, 2008; Miller et al., 2007). Even though occupational stress is an important type of stress, the social environment including social relationships should not be ignored. Then again, traditional personality traits have been found to be diversely involved in these processes as well. However, relatively little is known about the ways motivational personality characteristics potentially influence the stress-strain relationship. Implicit motives are of particular interest as they largely shape our daily lives and therefore, can have a significant impact on the perception of stress. Importantly, as implicit motives interact with motive-relevant incentives, the type of stress a person is exposed to needs to be considered (Code et al., 2001). Furthermore, implicit motives could explain why some individuals, when exposed to chronic stress, go on to show impairments in mental health and well-being while others do not experience this type of strain.

Hence, the general aim of the present thesis is to gain a better understanding of the role of implicit motives in the context of perceived chronic stress and an individual's mental health. Two empirical studies were conducted, which addressed different aspects of the main research question. In line with the transactional stress theory (Lazarus & Folkman, 1984), stress was operationalized as a subjective concept, and thus self-report measures for chronic stress were obtained.

For the first study, a sample of 101 vitally exhausted men was included. The participants were part of the working population and were recruited within the Men Stress 40+ study. In order to get a more differentiated picture, nine subtypes of work-related and social chronic stress were assessed. Participants' implicit motives for affiliation, achievement, and power were coded from fantasy stories collected with the PSE. The first aim of the study was to shed light

on the associations between an individual's perceived chronic stress and their degree of vital exhaustion. Second, the nature of the influence of implicit motives on the experience of chronic stress, social support, as well as vital exhaustion was analyzed. It was assumed that implicit motives would take effect on chronic stress both directly and indirectly (through social support). Furthermore, implicit motives should interact with motive-relevant types of stress to enhance or attenuate the negative effect of stress on vital exhaustion.

In the second study, the focus was on fatherhood as a potential source of social stress. Data from 271 men who took part in a larger study on the costs and benefits of fatherhood (Waldvogel & Ehlert, 2016) was used. Participants occupied a traditional paternal role and provided a rating of their perceived constraint due to fatherhood as well as their satisfaction with life in general. As studies have shown that affiliation and power are related to affiliative and generative behavior, respectively, it was hypothesized that these motives would protect fathers from experiencing constraint due to their paternal role. Consequently, they would report higher life satisfaction. The two empirical studies are described in the following second part of this thesis.

Part II: Empirical Studies

6. Do Implicit Motives Influence Perceived Chronic Stress and Vital Exhaustion?

This manuscript was submitted to the peer-reviewed journal *The Journal of Research in Personality* and can be cited as follows:

Schoch, J., Noser, E., & Ehlert, U. (submitted). Do Implicit Motives Influence Perceived Chronic Stress and Vital Exhaustion?

6.1 Introduction

Vital exhaustion (VE) is characterized by a lack of energy, feelings of demoralization, and irritability (Appels & Mulder, 1988). Over the last decade, it has received considerable research attention due to its adverse effects on health and well-being (Appels, 2004; Prescott, Holst, Grønbæk, Schnohr, Jensen, & Barefoot, 2003; Rafael, Simon, Drótos, & Balog, 2014; Tselebis et al., 2011). In particular, studies have found VE to be an independent risk factor for cardiovascular disease (Appels & Mulder, 1989; Frestad & Prescott, 2016).

The cause of VE is still not fully understood. It is hypothesized that it develops as a result of failed adaptation to chronic stress (Noser, Fischer, Schoch, & Ehlert, submitted; van Diest & Appels, 2002). When investigating the stress-strain relationship, it is critical to assess the specific type of stress. However, to date, only two studies have examined the association between chronic stress and VE. A study by our workgroup (Schnorpfeil et al., 2002) found that VE was linked to perceived work stress, including workload and qualitative demands at work. Another study found that VE was further positively related to chronic social conflicts at work (Falger & Schouten, 1992).

Besides the type of stress, social support should also be taken into account, since the perception of high social support has numerous benefits for physical and mental health (Taylor, 2011; Uchino, 2009). Conversely, low social support is considered to be stressful and detrimental for an individual's well-being. In our own research, men with severe VE reported the lowest levels of social support (Noser et al., submitted). Likewise, low perceived support from others was found to contribute to VE and heart failure (Cené et al., 2012). In summary, work-related and social stress, as well as low social support, are related to negative health states, including VE.

With respect to the psychobiological stress response, there is large interindividual variability, which is partly attributable to individual differences in personality (Bolger & Schilling, 1991; Parkes, 1994; Sapolsky, 1994; Spector & Bruk-Lee, 2008). Personality characteristics influence the probability that an individual will seek out certain situations and be exposed to potential stressors (Bolger & Zuckerman, 1995; Bresin & Robinson, 2015). They further affect how an individual appraises stressors. Therefore, individuals with specific personality characteristics might be more or less prone to experience stress in the first place. Similar assumptions hold true for the influence of personality on social support (Pierce et al., 1997; Swickert, 2009). Moreover, as the direct associations between the experience of stress and subsequent health states are only small to moderate, personality may function as an intervening variable (Code & Langan-Fox, 2001). Hence, individual differences in personality may render a person more vulnerable or resilient to the consequences of stress (Cohen & Edwards, 1989; Lee & Ashforth, 1996; Parkes, 1994; Wiebe & Smith, 1997).

In conclusion, personality characteristics might have a direct impact on the experience of stress and social support. Furthermore, they are potential moderators of the stress-strain relationship. These assumptions have already been confirmed for traditional personality traits such as the Big Five (e.g., Ebstrup et al., 2011; Lakey & Dickinson, 1994; Mroczek & Almeida, 2004; Parkes, 1990).

Previous research has largely neglected motivational aspects of personality, namely implicit motives, which represent the need to experience positive affect in response to specific incentives (Schultheiss, 2008). Studies have concentrated on the assessment of three social motives: affiliation, achievement, and power (Schultheiss, 2008). Affiliation is defined as a concern with warm, friendly relationships, while individuals motivated for achievement strive to attain a standard of excellence (McClelland et al., 1953). The implicit motive for power represents the need to have impact, control, or influence on others (Winter, 1973). Since implicit motives seem to be shaped during the preverbal phase in childhood, they are largely inaccessible to consciousness and are best assessed using projective measures (McClelland, 1989; Thrash et al., 2012).

The strength of each implicit motive influences processes of perception, cognition, affect, and subsequent behavior (McClelland, 1987; Schultheiss & Brunstein, 1999). Accordingly, implicit motives should be involved in the appraisal of a stressor, and thus be responsible for the experience of stress. To our knowledge, so far, only one study, conducted by our own workgroup, has tested this assumption. In a sample of fathers, we operationalized the experience of stress by men's ratings of their perceived constraint due to fatherhood. The implicit motive for affiliation was related to less perceived stress, whilst implicit power had the opposite effect

(Ruppen, Waldvogel, & Ehlert, 2016). Surprisingly, a literature search did not yield any studies investigating the role of implicit motives in social support.

Implicit motives might further affect the relationship between the experience of chronic stress and an individual's subsequent health. Implicit motives are aroused and become effective in situations that are relevant for the specific motivational domain (McClelland et al., 1953). For example, the experience of social stress should be threatening for individuals highly motivated for affiliation, as it bears the risk of frustrating this particular motive. Therefore, implicit motives might influence stress-related health consequences depending on the type of stress. Several experimental studies have investigated the moderating role of implicit motives. A high implicit motive for affiliation was found to dampen the effect of a social stressor on the subsequent cortisol response, while similar effects were not found in response to a physical stressor or in a control condition (Wegner et al., 2014). Presumably, individuals high in affiliation did not perceive the incentives inherent in the social stress condition (such as social evaluation) as threatening (Wegner et al., 2014), but rather regarded them as opportunities to satisfy their affiliative need. In a similar study, high levels of implicit achievement predicted an attenuated cortisol response after a competitive task, independent of whether participants won or lost (Schultheiss et al., 2014). The same results were obtained for a psychosocial stress situation compared to a control condition (Schultheiss et al., 2014). Since individuals high in achievement take pleasure in engaging in a task per se, due to their preference for mastering challenges, they are less likely to interpret such a situation as threatening or stressful (Lazarus & Folkman, 1984; Reeve, Olson, & Cole, 1987). In comparison, participants with high levels of power motivation showed increases in cortisol levels when they had lost a contest, but not when they had won (Wirth et al., 2006). Apparently, the frustration of their need for power resulted in a biological stress response.

Present Research

Previous studies show that when studying the consequences of the stress experience, one should consider specific types of stress rather than a general measure of chronic stress. Therefore, in a first step, we will examine different subtypes of work-related and social stress and their relation to VE.

Second, we plan to investigate the role of implicit motives in these relationships. Implicit motives might directly or indirectly influence the experience of social support, chronic stress, and VE. Implicit affiliation is hypothesized to be linked to higher perceived social support, and thus lower chronic stress and VE. The analyses regarding achievement and power remain largely exploratory in nature. Additionally, we will investigate whether implicit motives are

moderators of the stress-strain relationship. We assume that implicit affiliation leads to greater exhaustion in response to social stress. We further expect a buffering effect of implicit achievement on the association between work stress and VE. In contrast, higher implicit power motivation in combination with work stress should be more detrimental for the individual health.

6.2 Materials and Methods

Participants and Procedure

Data were collected in the framework of the Men Stress 40+ Study, a large research project investigating the effects of stress in men aged 40 to 75 years (Noser et al., submitted). Participants were recruited in the German-speaking part of Switzerland between January and September 2016 through flyer distribution, newspaper announcements, mailing lists, and online advertisements. Participants had to be male, aged 40 to 75 years, and fluent in the German language. Additionally, participants were screened for signs of VE, and the cut-off score for study inclusion was set at ≥ 4 on the Maastricht Vital Exhaustion Questionnaire (Kopp, Falger, Appels, & Szedmak, 1998). Exclusion criteria were current mental or somatic illness, intake of psychotropic substances or illegal drugs in the past two months, being in psychotherapy in the last six months, or consumption of more than two alcoholic units per day.

The local Ethics Committee of the Canton of Zurich approved the study protocol before data collection. All participants provided written informed consent. Psychometric data were gathered online. Participants were invited to a laboratory session at the Department of Clinical Psychology and Psychotherapy at the University of Zurich, where they wrote short texts for the assessment of implicit motives. The original sample consisted of 123 men. We excluded thirteen men because they either did not provide a text for each picture cue or their texts did not meet the required word count of at least 30 words. A further nine men were excluded because they could not report work-related stress due to being retired. This resulted in a final sample of 101 participants.

Measures

Perceived Chronic Stress was assessed with the short form of the Trier Inventory for the Assessment of Chronic Stress (TICS-2-K; Schulz, Schlotz, & Becker, 2004). Participants were asked how often they had experienced the described stressful situations in the past three months. Answers were given on a 5-point Likert scale ranging from 0 (“never”) to 4 (“very often”). An example situation is: “Times when none of my tasks seem meaningful to me” (Schulz et al.,

2004). The questionnaire consists of 30 items that fall into nine different subscales assessing chronic stress in the work and social environment: work overload, social overload, excessive demands at work, lack of social recognition, work discontent, social tension, performance pressure, lack of social contact, and chronic worrying. Additionally, a general screening scale for perceived chronic stress composed of six items can be used for an initial assessment.

Perceived Social Support and *Support Seeking* were measured with two subscales of the Berlin Social Support Scales (BSSS; Schulz & Schwarzer, 2003). Each subscale comprises eight items, which are rated on a Likert scale from 1 ("strongly disagree") to 4 ("strongly agree"). Items were averaged to build a score for each subscale, with a range from 1 to 4. An example item for perceived social support is: "There is always someone there for me when I need comforting." An example item for support seeking is: "Whenever I am worried, I reach out to someone to talk to."

Vital Exhaustion was assessed with the short form of the German Maastricht Vital Exhaustion Questionnaire (Kopp et al., 1998). The nine items cover aspects of VE such as fatigue, loss of energy, or irritability. An example item is: "Do you sometimes feel that your body is like a battery that is losing its power?" The symptoms are rated as "no" (score 0), "don't know" (score 1), or "yes" (score 2), resulting in a possible range from 0 to 18.

Implicit Motives. We used the Picture Story Exercise (PSE, Schultheiss & Pang, 2007) to produce text samples, which were then coded for implicit motive dispositions in the domains of affiliation, achievement, and power. Participants were shown the following six picture cues for 10s each in a randomized order: boxer (McClelland & Steele, 1972), nightclub scene (McClelland, 1975), ship captain, trapeze artists, women in laboratory, and couple by river (Smith, 1992). They were asked to take four minutes to write an imaginative story about the characters shown in the pictures. We used standard instructions and procedures as described in Smith (1992). The PSE was administered on a computer during the laboratory session.

Stories were coded for motivational imagery according to the Manual for Scoring Motive Imagery in Running Text (Winter, 1994). Affiliation (*n*Aff) is scored whenever a character expresses concern with establishing, maintaining, or restoring friendly relations such as engaging in affiliative activities or showing sadness about a separation. Achievement (*n*Ach) is scored whenever a character is concerned with achieving a standard of excellence. This includes winning against or competing with others, disappointment about failure, or unique accomplishments. Power (*n*Pow) describes a concern with having impact, control, or influence

on others. It is coded whenever a character shows strong, forceful actions, tries to impress, provides unsolicited help, is concerned with reputation, or elicits strong emotions in others. The coder for the present study had attained over 85% inter-rater agreement on expert codings of calibration materials provided by Schultheiss (2015) and underwent several hours of scoring practice prior to coding (Ruppen et al., 2016). Scores from different subscales within a given motive domain were averaged. The significant influence of word count on motive scores was removed by regressing implicit motives on word count, and motive residuals were converted to z-scores for further analyses.

Statistical Analyses

Statistical analyses were performed using the IBM Statistical Package for the Social Sciences (SPSS Version 23) and AMOS 23.0 software package. Statistical significance was defined as $p < .05$ (two-tailed). The relationship between implicit motives, social support, chronic stress, and VE was investigated using correlation analyses with Pearson's *r*. We controlled for the sociodemographic variables age, income, and education (dichotomized), as they have proven to be relevant in the context of stress and exhaustion.

For the structural equation model, we applied a maximum-likelihood technique. Bootstrapping was set to k = 10'000 and 95% bias-corrected bootstrap confidence intervals were computed (Preacher & Hayes, 2008). A model was considered to have a good fit if all path coefficients were significant at the level of $p < .05$, χ^2/df was < 2.5 (Bollen, 1989), RMSEA ≤ 0.05 (Steiger, 1990), and CFI > 0.93 (Byrne, 1994). Indirect effects through more than one mediator were analyzed using PROCESS model 6 (Hayes, 2016).

We ran moderation analyses using PROCESS model 1 (Hayes, 2016) to test for the moderating effect of implicit motives on the association between chronic stress and VE. We controlled for the same sociodemographic variables as used before. All variables were z-standardized prior to entry into the model. As suggested by Aiken and West (1991), the interaction was analyzed by calculating simple slopes between chronic stress and VE at three levels of the moderators: low (one standard deviation below the mean), average (at the mean), and high (one standard deviation above the mean).

6.3 Results

Descriptive statistics and intercorrelations

Characteristics of the participants are shown in *Table 1*. Descriptive statistics and intercorrelations among the main study variables are reported in *Table 2*. Implicit motives were

not related to VE ($p > .05$). VE showed several significant and positive correlations with subscales of chronic stress as well as a positive relation with perceived social support ($r = -.252$, $p = 0.012$).

Table 1. Characteristics of the sample ($N = 101$); data are presented as mean and standard deviation (for age) or absolute and relative frequencies

	Descriptive
Age (years)	50.52 (6.58)
Educational attainment	
Vocational training	24 (23.8%)
High school degree	20 (19.8%)
College/university degree	47 (46.5%)
Other	10 (9.9%)
Annual income (Swiss Francs)	142’911 (89’978)
Relationship status	
Not in a relationship	9 (9.0%)
In a relationship	92 (91%)
Children	
No	20 (19.8%)
Yes	81 (80.2%)

Table 2. Inter-correlations among implicit motives, support seeking, perceived social support, subscales of chronic stress, and vital exhaustion

	M	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Affiliation	6.77	3.03	1														
2. Achievement	4.31	2.92	-.225*	1													
3. Power	3.59	2.53	-.015	.263**	1												
4. Perceived social support	3.36	0.56	.196†	.285**	.005												
5. Support seeking	2.55	0.55	.241*	.065	.079	.354***											
6. Work overload	7.16	2.33	-.009	-.109	.011	-.288**	-.124	1									
7. Social overload	7.45	2.99	.128	.080	.065	-.212*	.056	.354***	1								
8. Pressure to perform	10.60	3.69	.303**	.120	.114	-.178†	.101	.240*	.393***	1							
9. Work discontent	4.22	2.43	-.130	-.004	-.158	-.129	-.295**	.017	.058	.135	1						
10. Excessive demands at work	3.65	1.99	.139	-.149	-.080	-.303**	-.029	.339**	.429***	.317**	.137	1					
11. Lack of social recognition	4.94	2.42	.062	-.042	.094	-.217*	-.302**	.346***	.295**	.157	.457***	.321**	1				
12. Social tensions	3.85	1.92	-.070	-.089	.055	-.311**	-.074	.284**	.273**	.174†	.299**	.306**	.343**	1			
13. Lack of social contact	4.46	2.11	-.037	-.274**	-.134	-.413***	-.187†	.360***	.166	.276**	.316**	.351***	.329**	.245*	1		
14. Chronic worrying	5.38	2.35	.187†	-.106	.029	-.418***	.024	.430***	.408***	.428***	.113	.502***	.357***	.389***	.397***	1	
15. Vital exhaustion	11.29	3.59	.115	-.110	-.066	-.252*	-.156	.265**	.070	.119	.203*	.240*	.382***	.186†	.214*	.398***	1

Note. $N = 101$. Implicit motives are listed in rows 1-3, measures of support seeking and perceived social support are reported in rows 4 and 5, subscales of perceived chronic stress are shown in rows 6-14, vital exhaustion in the last row. Control variables: age, income, education (dichotomized).

Range of 1 – 4 is possible for perceived social support and support seeking; range of 0 – 12 for the chronic stress subscales *work overload, work discontent, excessive demands at work, lack of social recognition, social tensions, lack of social contact,* and *chronic worrying*; range of 0 – 16 for *social overload*, range of 0 – 20 for *pressure to perform*, range of 0 – 18 for vital exhaustion.

SD: standard deviation. Significance levels (two-tailed): † $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

Structural Equation Modeling

In order to test the relationships between implicit motives, perceived chronic stress, perceived social support, and VE in an overall model, we applied structural equation modeling. We tested a hypothesized structural equation model that included direct paths from each implicit motive to chronic stress, social support, and VE. Additionally, we modeled indirect paths from implicit motives to chronic stress through social support and to VE through social support and chronic stress. The first model with all hypothesized paths fitted the data well, χ^2 (1, N = 101) = 0.109, p = 0.741; χ^2/df =0.109; RMSEA = 0.000 (0.000, 0.185); CFI = 1.000. However, the following paths were not significant (p > .05) and were therefore removed: direct paths from support seeking, social support, *n*Aff, and *n*Ach to VE, direct path from *n*Aff to social support, from *n*Ach to support seeking, and from *n*Ach to chronic stress. Furthermore, *n*Pow was completely removed from the model as none of its paths were significant.

The final model as shown in *Figure 1* showed a very good fit to the data: χ^2 (8, N = 101) = 4.896, p = 0.769; χ^2/df =0.612; RMSEA = 0.000 (0.000, 0.081); CFI = 1.000. Direct and indirect effects are reported in *Table 3*. The indirect effect of affiliation on VE through chronic stress was β = 0.079 (0.036, 0.019), p = 0.012. Furthermore, affiliation showed an indirect negative effect on VE through higher support seeking and higher social support and consequently lower chronic stress, β = -0.014 (-0.051, -0.003), p < .05.

The indirect effect of achievement on chronic stress through social support was β = -0.128 (-0.230, -0.043), p = 0.011. Implicit achievement further indirectly influenced VE through higher social support and lower chronic stress, β = -0.046 (-0.115, -0.013), p < .05. The overall model accounted for 6% of the variance in support seeking, 19% of the variance in perceived social support, 28% of the variance in perceived chronic stress, and 17% of the variance in VE.

Table 3. Direct and indirect effects and 95% confidence intervals for the overall structural equation model

			95% CI		
	B	*SE*	Lower bound	Upper bound	*p*
Direct effects:					
AFF → CS	0.236	0.079	0.073	0.384	0.005
AFF → SS	0.243	0.095	0.046	0.421	0.018
ACH → PSS	0.253	0.084	0.077	0.409	0.006
SS → PSS	0.342	0.093	0.152	0.512	0.001
PSS → CS	-0.505	0.085	-0.654	-0.317	0.000
CS → VE	0.407	0.090	0.211	0.568	0.000
Indirect effects:					
AFF → CS → VE	0.079	0.036	0.019	0.162	0.012
AFF → SS → PSS	0.083	0.043	0.016	0.187	0.011
AFF → SS → PSS → CS	-0.041	0.024	-0.109	-0.008	*
AFF → SS → PSS → CS → VE	-0.014	0.011	-0.051	-0.003	*
ACH → PSS → CS	-0.128	0.047	- 0.230	-0.043	0.004
ACH → PSS → CS → VE	-0.046	0.024	-0.115	-0.013	*

Note. $N = 101$.

AFF: Implicit affiliation motive; ACH: Implicit achievement motive; CS: Chronic stress; PSS: Perceived social support; SS: Support seeking; VE: Vital exhaustion

* Indirect effects with two or more mediators were tested in PROCESS. No significance levels are given. Instead, significant effects are indicated by bootstrapped confidence intervals not including 0.

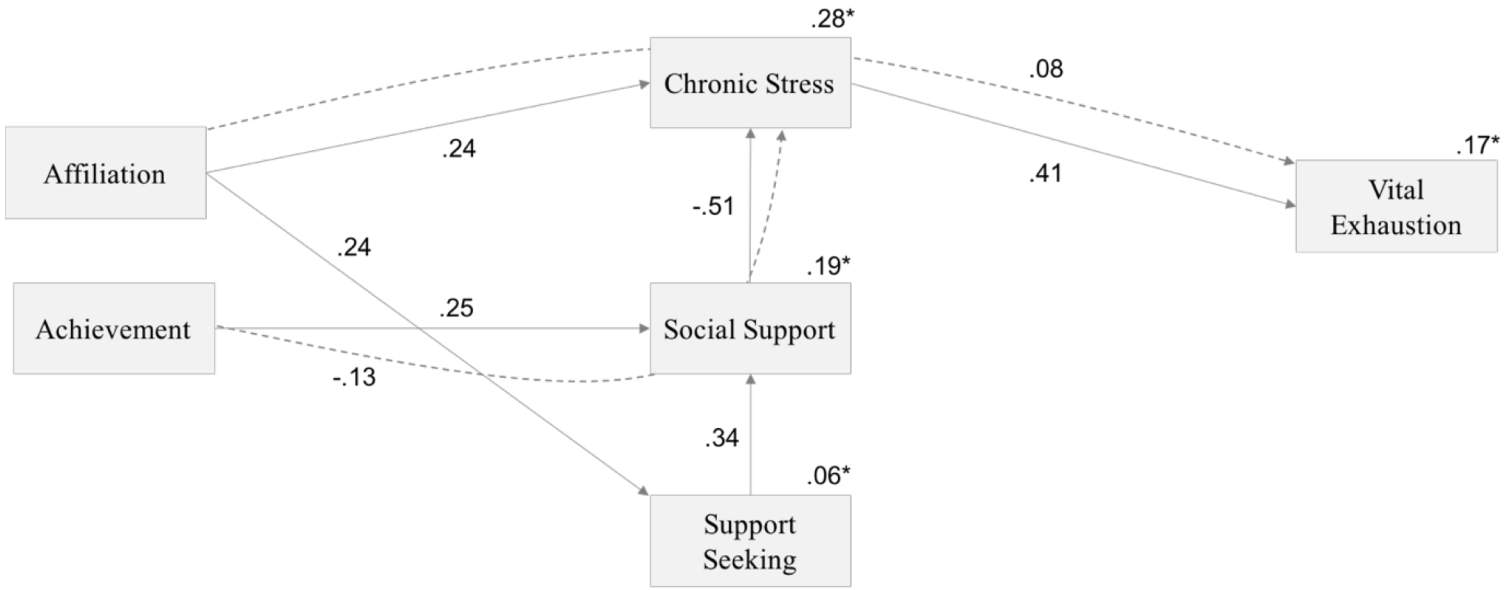


Figure 1. Structural equation model showing direct and indirect relationships between implicit motives, support seeking, perceived social support, perceived chronic stress, and vital exhaustion. Dashed arrows show indirect effects of achievement on chronic stress through the mediator social support as well as the indirect effect of affiliation on vital exhaustion through the mediator chronic stress. Significant standardized regression coefficients are shown in the numbers adjacent to the arrows. Numbers with asterix represent variance explained.

Moderation Analyses

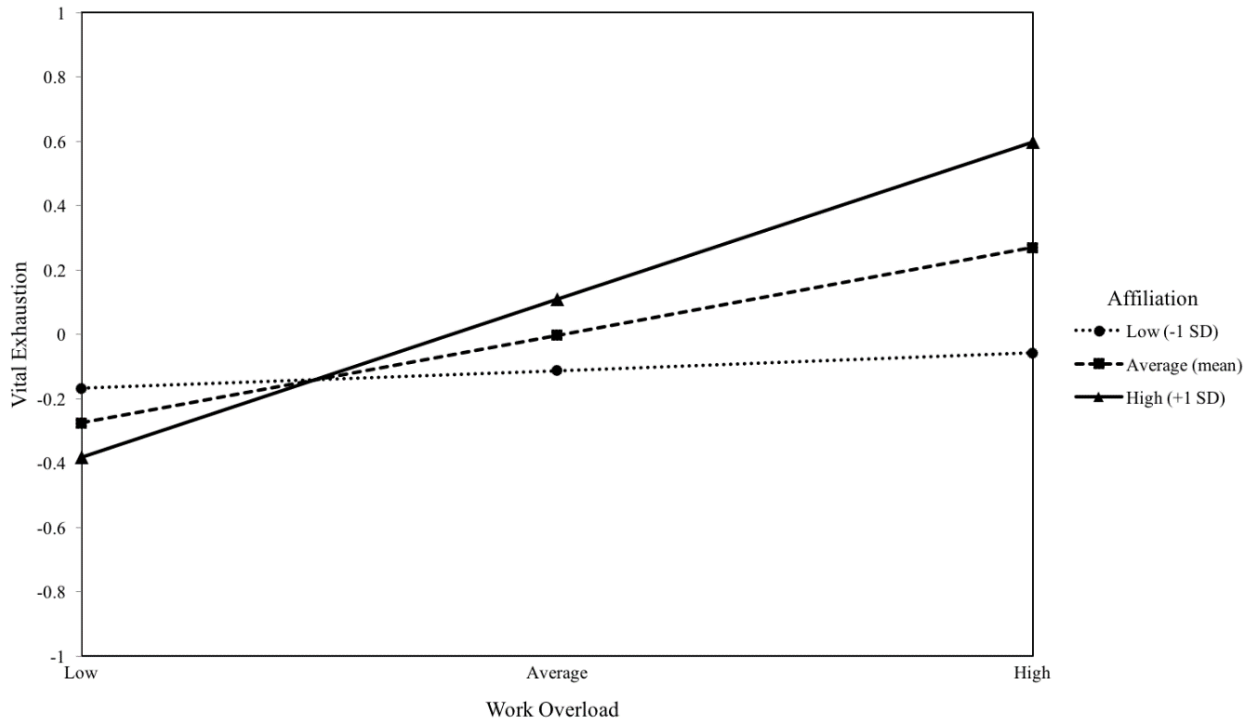
Analyses from the first part of this study showed that implicit motives influence the level of perceived chronic stress, perceived social support, and VE. Next, we tested whether implicit motives might also serve as moderators of the relationship between perceived chronic stress and VE. Implicit motives did not moderate the relationship between a general measure of chronic stress and VE ($p > .05$). However, as indicated in the manual of the Trier Inventory of Chronic Stress (Schulz et al., 2004), the different subscales of chronic stress should be considered in order to determine which specific type of stress contributes to strain. Furthermore, previous research on implicit motives suggests that they become effective in situations that are relevant for the specific motivational domain (Wegner et al., 2014; Wirth et al., 2006).

Therefore, we ran moderation analyses for subtypes of chronic stress. We tested both implicit affiliation and achievement as moderators, as they were found to be relevant in the first part of this study, as opposed to implicit power motivation. The correlation analyses reported in *Table 1* revealed significant positive relationships between VE and the following subscales of perceived chronic stress: *work overload, work discontent, excessive demands at work, lack of social recognition, lack of social contact*, and *chronic worrying*. We assumed that *lack of social recognition* would only be relevant in combination with implicit power, and thus removed this variable from our analyses. *Chronic worrying* was also not examined, as this scale is of a more general nature and the source of the worries cannot be determined (Schulz et al., 2004). Accordingly, VE was separately regressed on *work overload, work discontent, excessive demands at work,* and *lack of social contact*. Only models in which the interaction term reached significance are reported below.

Affiliation and Work Overload

Work overload was a significant predictor of VE ($\beta = 0.27$, $p = 0.009$). Implicit affiliation did not predict VE ($\beta = 0.11$, $p > .05$). However, the interaction between the independent variables was a significant predictor of VE ($\beta = 0.21$, $p = 0.014$). Inspection of conditional effects as shown in *Figure 2* revealed that the effect of work overload on VE was only significant at average and high levels of affiliation ($\beta = 0.27$, $p = 0.009$ and $\beta = 0.49$, $p < .001$). The overall model was significant and explained 13% of the variance in VE ($F(6, 94) = 3.01$, $p = 0.009$).

Figure 2. The moderating effect of implicit affiliation motive on the association between work overload and vital exhaustion.

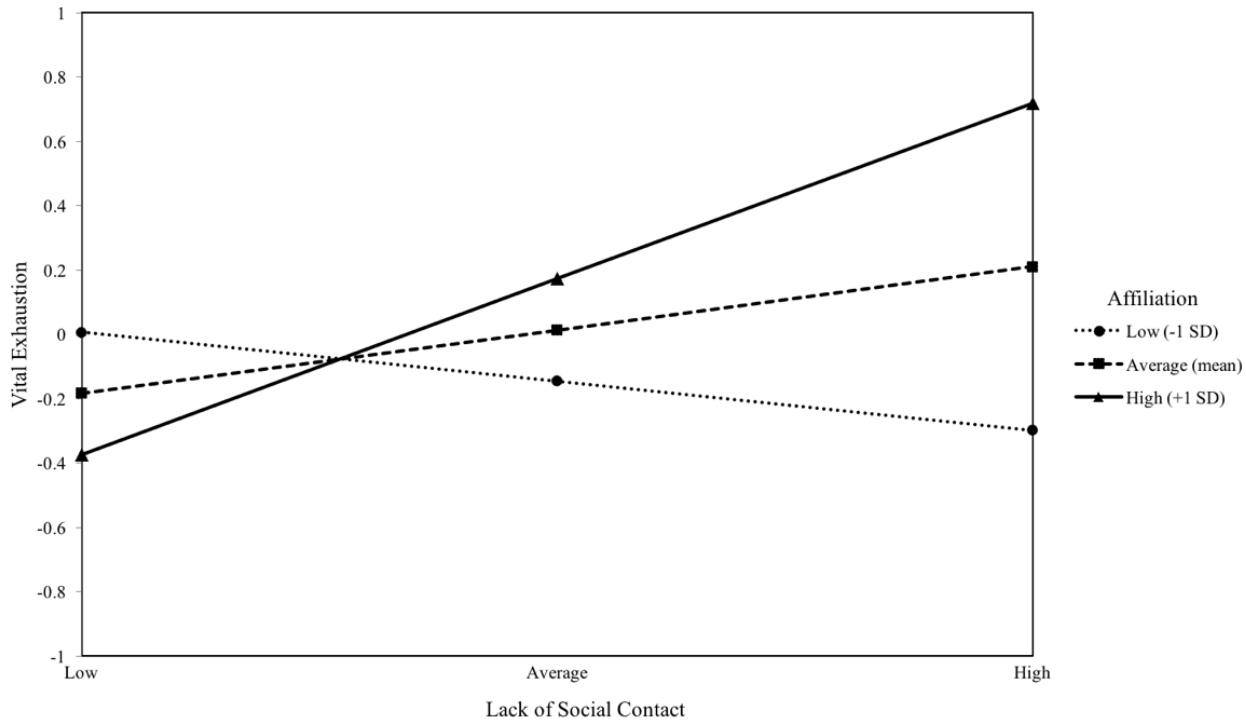


Note. Simple slopes of work overload predicting vital exhaustion for 1 *SD* below the mean of affiliation, at the mean of affiliation, and 1 *SD* above the mean of affiliation.

Affiliation and Lack of Social Contact

Again, implicit affiliation was not a significant predictor of VE ($\beta = 0.16$, $p > .05$). Lack of social contact positively predicted VE ($\beta = 0.20$, $p = 0.041$). The interaction effect of affiliation and lack of social contact was a significant predictor of the dependent variable ($\beta = 0.34$, $p = 0.002$). This interaction is illustrated in *Figure 3*. Lack of social contact significantly predicted VE only in those individuals with an average need for affiliation ($\beta = 0.20$, $p = 0.041$) or one standard deviation above the mean ($\beta = 0.55$, $p < .001$). The model with all variables was significant ($R^2 = 0.15$, $F(6, 94) = 4.15$, $p = 0.0010$).

Figure 3. The moderating effect of implicit affiliation motive on the association between lack of social contact and vital exhaustion.



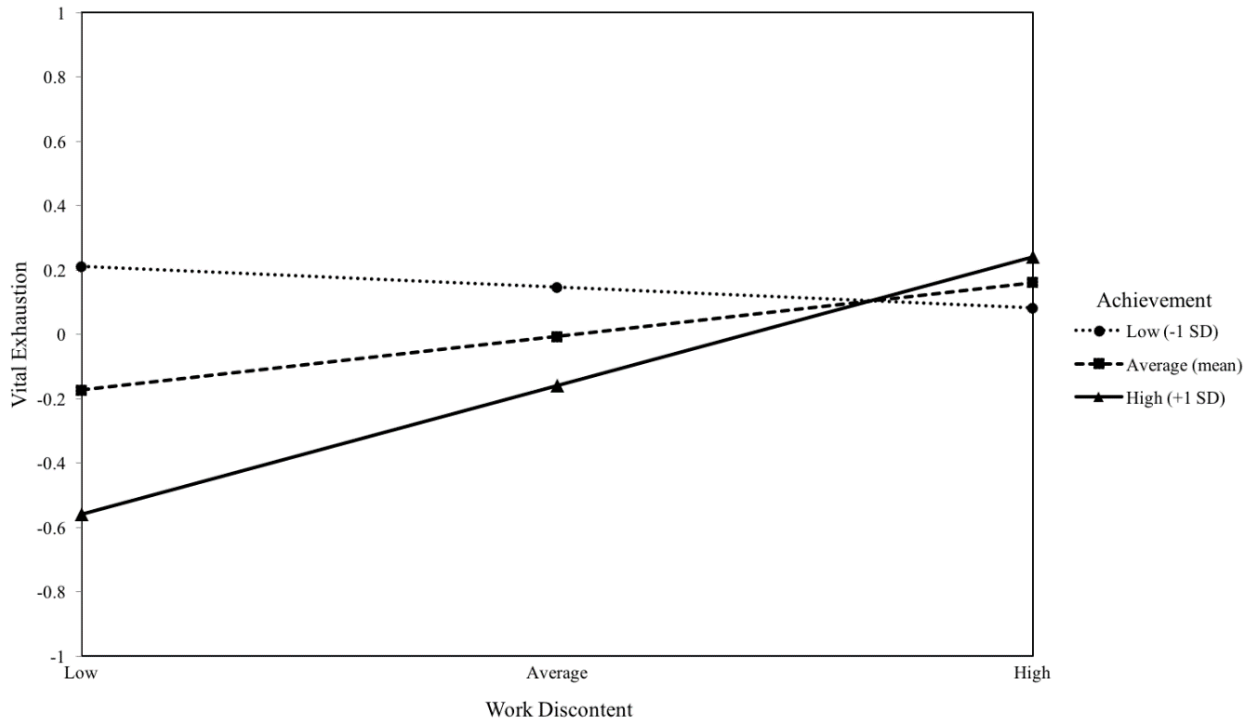
Note. Simple slopes of lack of social contact predicting vital exhaustion for 1 *SD* below the mean of affiliation, at the mean of affiliation, and 1 *SD* above the mean of affiliation.

Achievement and Word Discontent

VE was not predicted by implicit achievement (β = -0.15, $p > .05$) or by work discontent (β = 0.18, $p > .05$). In contrast, the interaction term between achievement and work discontent significantly predicted VE (β = 0.23, p = 0.019). Work discontent was a significant predictor of VE only at high levels of the moderator, as displayed in *Figure 4* (β = 0.41, p = 0.002). However, the overall model including all control variables was not significant (R^2 = 0.11, F(6, 94) = 1.99, p = 0.074).

Removing the non-significant control variables resulted in the model reaching significance, with only minor changes in standard coefficients of the independent variables and the interaction term. This altered model explained the same amount of variance in VE (R^2 = 0.11, F(3, 97) = 4.02, p = 0.009).

Figure 4. The moderating effect of implicit achievement motive on the association between work discontent and vital exhaustion.

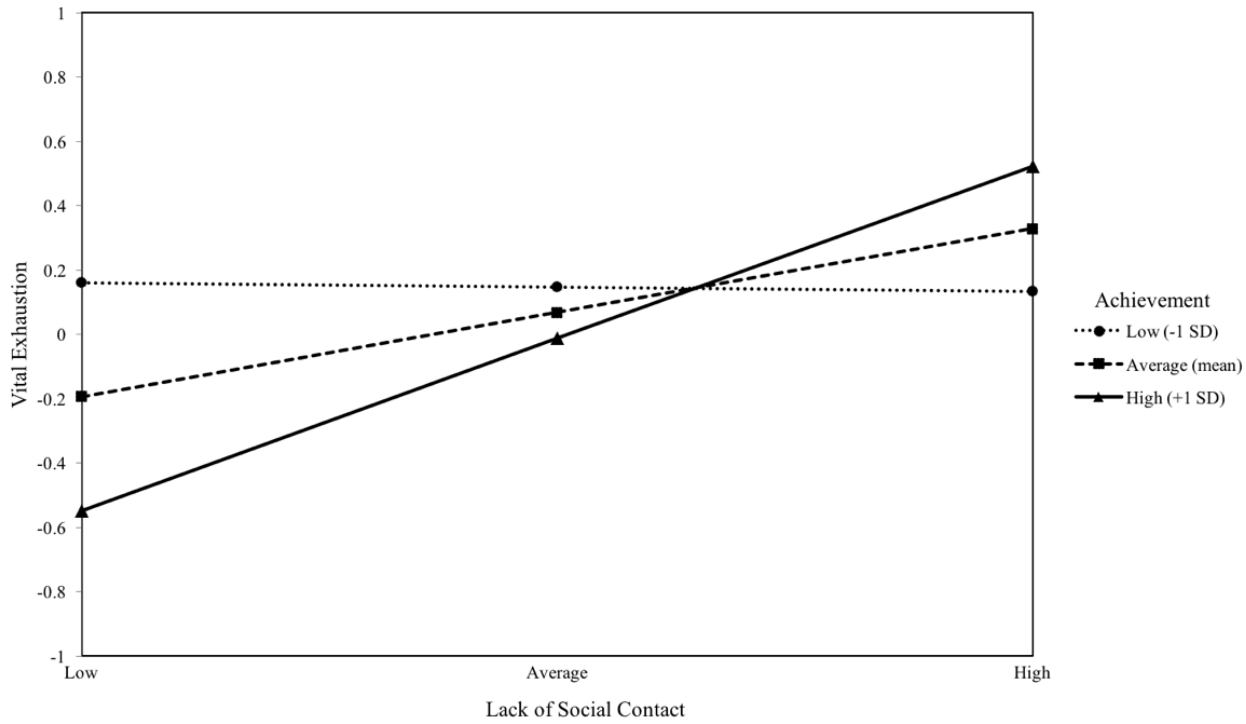


Note. Simple slopes of work discontent predicting vital exhaustion for 1 *SD* below the mean of achievement, at the mean of achievement, and 1 *SD* above the mean of achievement.

Achievement and Lack of Social Contact

As in the previous models, lack of social contact was a significant predictor of VE ($\beta = 0.26$, $p = 0.018$), unlike implicit achievement ($\beta = -0.08$, $p > .05$). The interaction effect significantly predicted VE and is illustrated in *Figure 5* ($\beta = 0.27$, $p = 0.042$). The effect of lack of social contact on VE was significant at average and high levels of achievement ($\beta = 0.26$, $p = 0.018$ and $\beta = 0.54$, $p < .001$). The regression model explained 11% of the variance in VE ($F(6, 94) = 2.21$, $p = 0.049$).

Figure 5. The moderating effect of implicit achievement motive on the association between lack of social contact and vital exhaustion.



Note. Simple slopes of lack of social contact predicting vital exhaustion for 1 *SD* below the mean of achievement, at the mean of achievement, and 1 *SD* above the mean of achievement.

6.4 Discussion

This study addressed the role of implicit motives in the experience of chronic stress, social support, and VE in middle-aged men. VE was positively associated with work-related stress, namely work overload, excessive demands at work, and work discontent. Furthermore, men who reported chronic worrying also experienced more symptoms of exhaustion. In terms of social stress, lack of social recognition and social contact were positively related to VE. In contrast, support-seeking behavior and perceived social support were linked to lower levels of VE.

Implicit motives were hypothesized to potentially exert a direct and indirect influence on the perception of chronic stress, social support, and the level of VE. Implicit affiliation was positively associated with VE through increased perceived chronic stress. The effect of affiliation on VE became negative when the pathways through support seeking and perceived social support were considered. Likewise, implicit achievement was linked to lower VE through higher perceived support and less chronic stress. We found no direct correlations between implicit motives and VE or between implicit power and chronic stress or social support.

Implicit motives further moderated the relationships between subtypes of stress and VE. Affiliation increased the negative effect of work overload and lack of social contact on VE, while achievement enhanced the negative association between VE and lack of social contact and work discontent, respectively.

The present findings indicate that specific subtypes of perceived chronic stress are related to the experience of VE. Even though several of these stressors are rooted in the context of work, stressors inherent in the social environment have been shown to impair mental health as well.

Work overload and excessive demands at work were both positively correlated with VE. Similar results have consistently been reported for emotional exhaustion, a component of burnout (Alarcon, 2011; Qaiser et al., 2015). With respect to VE, only one other study, from our workgroup, showed a positive association between workload and VE in a sample of industrial employees (Schnorpfeil et al., 2002). The positive association between work discontent and VE represents a new finding. A meta-analysis previously showed that job satisfaction was negatively related to emotional exhaustion (Alarcon, 2011). According to the authors of the stress inventory used in this study, discontent arises when tasks need to be completed that do not meet one's own interest or for which one's abilities cannot be used (Schulz et al., 2004). Therefore, improving the fit between an individual's interests and skills and the characteristics and demands of their tasks should improve satisfaction with work. Moreover, work discontent was positively correlated with lack of social recognition and social contact. Thus, the social environment at least co-determines whether a person is satisfied with his/her work.

Humans rely heavily on social relationships and cues from their social environment. In our study, social support appeared to be a protective factor against the experience of stress, and consequently, VE. However, the present sample had slightly lower ratings of perceived support compared to those in other studies (Schwarzer & Schulz, 2003; Wirtz et al., 2006). Individuals with low support are at a higher risk of VE and heart failure (Cené et al., 2012). In this study, perceived lack of social contact was also positively associated with VE. The correlations further suggest that lack of social contact might arise from work overload and excessive demands at work. Being absorbed in work not only decreases the time spent with colleagues at work but also reduces the interactions with friends and family in one's private life. Furthermore, lack of social recognition was associated with higher VE. Previous research showed that lack of social recognition is responsible for the experience of stress and burnout (Lowenstein, 1991; McLean & Andrew, 2000). Recognition involves appreciation both of one's work and of one's person. Creating a work culture that shows appreciation for an individual's achievements on a regular

basis, without losing sight of the person behind the success, might help to reduce the risk of feeling exhausted.

Finally, chronic worrying was strongly related to the degree of VE. Perseverative worry is involved in anxiety disorders and depression, but is also a common stress response in non-psychiatric populations (Ladouceur et al., 1999; Tallis et al., 1992). However, chronic worrying prolongs the physiological stress response, and is thus related to impairments in health and well-being (Brosschot et al., 2006; Brosschot & Van Der Doef, 2006). For example, worrying was found to be a significant predictor of coronary heart disease in men (Kubansky et al., 1997). Mindfulness-based interventions have shown to be effective in reducing chronic worrying and the degree of stress and burnout (Delgado et al., 2010; Roeser et al., 2013). In sum, chronic worrying appears to be an important aspect of VE. Nevertheless, longitudinal studies need to clarify whether worrying is a cause or a consequence of VE.

It is important to note that the present sample differs from other study populations with respect to the degree of VE and the perception of chronic stress. Compared to other male samples of a similar age range, on average, the participants in this study reported being more vitally exhausted (Rafael et al., 2014; Schnorpfeil et al., 2002). Interestingly, however, their mean perception of chronic stress was lower than the mean of a representative German sample, with the exception of chronic worrying (Petrowski et al., 2012). Presumably, it is not the quantitative experience of stress per se that leads to signs of VE, but rather other processes involved, such as an individual's implicit motives.

The present results suggest that individuals high in implicit affiliation are more prone to experience stress and VE. Moderation analyses further confirmed that this was particularly true for motive-relevant stress. With an excessive amount of work, individuals high in affiliation have less time and fewer opportunities to satisfy their affiliative needs through the maintenance of social relationships. Likewise, implicit affiliation increased the negative relationship between lack of social contact and VE. Individuals motivated for affiliation are vulnerable to separation and rejection, to which they react with negative emotions such as sadness (McClelland et al., 1989). Wirth and Schultheiss (2006) found that participants' cortisol levels increased after they had watched an affiliation-themed film, which contained strong elements of rejection (Wirth & Schultheiss, 2006). Hence, lack of social contact is threatening to the need for affiliation, and thus impairs well-being.

However, the negative effect of affiliation on VE diminished when social support was taken into account. Individuals higher in affiliation apparently seek and perceive more social support. Upon experiencing stress, the steroid hormone progesterone is released, promoting affiliative behavior and in turn helping the individual to adjust to a stressor (Taylor, 2009;

Wirth, 2011). Showing tend-and-befriend behavior in the face of stress is more characteristic of women than of men, although not exclusively so (Taylor, 2009). It is likely that men who are highly motivated for affiliation also favor this type of stress response.

Contrary to expectations, implicit achievement motivation was linked to more perceived support, and thus lower chronic stress and VE. A high need for achievement further increased the negative influence of lack of social contact on VE. These findings are rather surprising, since achievement has rarely been considered in studies on social relationships. However, achievement is shaped in childhood in response to parents' reactions to the success or failure in mastering challenges (McClelland & Pilon, 1983). Therefore, social signals should remain important for achievement motivated individuals in adulthood (Stanton, Hall, & Schultheiss, 2010). Support for this assumption comes from a re-analysis of an experimental study by Schultheiss and Hale (2007): Participants with a higher need for achievement directed their attention more towards joyful faces as opposed to surprised or angry faces. Furthermore, certain tasks can only be accomplished by collaborating with others (Pang, Villacorta, Chin, & Morrison, 2009). Hence, lack of social contact might prevent a person from satisfying their need for achievement. Nevertheless, this line of argument remains speculative, and further studies are needed to determine the meaning of this finding.

Implicit achievement further exacerbated the negative relationship between work discontent and VE. This finding is in contrast to the study by Schultheiss and colleagues (2014), which showed that high achievement attenuated the acute stress response in a competitive task. In general, individuals motivated for achievement view difficulties as challenging rather than stressful (Reeve et al., 1987). These results suggest that different mechanisms could be relevant when individuals motivated for achievement are exposed to chronic as opposed to acute stress.

A number of studies have shown that implicit power is involved in an individual's health and well-being (Hall et al., 2010; Ruppen et al., 2016; Wirth et al., 2006). In the present sample, however, implicit power was unrelated to any other variables. In general, the work environment should provide various incentives to satisfy power-related needs. Therefore, power-motivated men might not have experienced their work to be as stressful compared to individuals who are more strongly concerned with affiliation or achievement in the first place. This hypothesis should be explored in future research.

Our results are subject to certain limitations. The cross-sectional design of the study does not allow for conclusions about the direction of causality of the relationship between chronic stress and VE. Possibly, men who were more vitally exhausted in the first place also experience more chronic stress due to their exhaustion. However, the causal directions assumed in the present

study are based on a theoretical framework and have been reported in longitudinal research as well (Chandola et al., 2006; Godin, Kittel, Coppieters, & Siegrist, 2005; Rod, Grønbæk, Schnohr, Prescott, & Kristensen, 2009). Nevertheless, a replication of our results in studies using a longitudinal design would strengthen the value of our findings. Furthermore, the reported findings only apply to employed men aged 40 to 65 years who showed signs of VE. Other individuals might differ with regard to the experience of stress, support, VE, and the role of implicit motives in these processes. Future studies should therefore extend their investigation to different populations. A major strength of this study is the combination of self-reported data and projective measures. Furthermore, we assessed a range of subtypes of perceived chronic stress, which permitted a more detailed analysis of the stressor-strain relationship.

This study adds to the growing literature on VE by identifying specific types of perceived chronic stress and their individual association with signs of exhaustion. Besides work stress, the social environment is an important factor to consider, as it constitutes both a resource and a source of stress. The present findings offer starting points for stress intervention studies. In particular, the focus should be on providing opportunities for social exchange and improving social relationships.

Furthermore, first evidence was provided for the role of motivational aspects of personality in the stress-strain relationship. The implicit motives for affiliation and achievement play a key role with respect to the experience of chronic stress, social support, and VE. Consequently, an individual's implicit motives need to be considered when planning prevention or intervention measures. In conclusion, this study contributes to a better understanding of the individual differences in the experience of stress and support, and the development of stress-related psychological health outcomes.

7. Implicit Motives and Men's Perceived Constraint in Fatherhood

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7.1 Introduction

Fatherhood is an important developmental life phase for men. However, the paternal role can be experienced as both constraining or fulfilling and therefore, may have both positive and negative consequences for men's well-being and satisfaction with life. Despite the importance of this topic, little is known about men's subjective experience in fatherhood. Moreover, factors influencing fathers' experiences need to be identified. According to Belsky (1984), parent personality is of central importance for parenthood and differences in personality influence variations in parenting (Prinzie, Stams, Deković, Reijntjes, & Belsky, 2009). Implicit motives as part of one's personality are likely to shape fathers' subjective perceptions of fatherhood such as the degree of constraint he experiences due to his paternal role.

Research emphasizes the role of implicit motivation in our everyday lives due to its influence on social relationships. The implicit motivational system develops in early, preverbal childhood and is formed through emotional experiences (McClelland, 1987; Thrash et al., 2012). Implicit motives are defined as enduring preferences for specific types of incentives that are experienced as rewarding (Schultheiss, 2008). They are largely inaccessible to consciousness (McClelland et al., 1989). Nevertheless, they predict spontaneous and long-term behavioral trends by selecting, energizing, and orienting behavior toward preferred stimuli (McClelland et al., 1989). They influence cognitive and emotional processes and, as a consequence, social relationships (McClelland, 1987; Schultheiss & Brunstein, 1999). Motive satisfaction is achieved by engaging in motive-congruent behavior, meaning pursuing activities that are in line with our implicit motives (McAdams & Bryant, 1987). Since implicit motives represent the *need* for particular affective experiences, motive satisfaction leads to positive affect and higher emotional well-being (Brunstein, Lautenschlager, Nawroth, Pöhlmann, & Schultheiss, 1995; McClelland, 1985). Motive frustration, however, constitutes a hidden stressor and is associated with negative feelings (Hofer & Busch, 2011). According to

McClelland's Motive Disposition Theory (McClelland, 1985), the strength of an implicit motive determines the capacity for motive satisfaction or frustration. Thus, a high implicit motive results in either more positive or negative affect, depending on the ability to show corresponding behavior (McAdams & Bryant, 1987).

From an evolutionary perspective, motives increase our chances of survival and reproductive success (Baumeister & Leary, 1995; Buss, 2001). Several attempts to identify the most relevant motives for human behavior have been made, but no consensus has been reached so far (Aunger & Curtis, 2013). Interpersonal behavior, however, has consistently been described along the two dimensions of communion and agency or affiliation and power, respectively (Bakan, 1966; Brunstein, Schultheiss, & Grässman, 1998; Stanton et al., 2010).

The implicit need for affiliation reflects a concern for establishing, maintaining, or restoring relationships (Schultheiss, 2008). Forming relational bonds was evolutionarily desirable since it increased chances of survival through the protection within a social network (Hall et al., 2010). Highly affiliation motivated individuals were more sympathetic toward others, showed more social behavior day by day and reported more positive affect when interacting with others (Koestner & McClelland, 1992; McAdams & Constantian, 1983; Sorrentino & Field, 1986).

The implicit motive for power is defined as a concern for having impact, influence, or control on others (Schultheiss, 2008). Ranking high in the group hierarchy and being in control over resources was an important prerequisite to ensure survival (Hall et al., 2010). As shown from a variety of studies, a high implicit power motive was associated with aggressive behavior (Mason & Blankenship, 1987; Winter, 1973), less relationship satisfaction (Stewart & Rubin, 1976), and a higher divorce rate (McClelland et al., 1972). However, the implicit power motive can also be enacted in a prosocial manner by teaching or providing unsolicited help (McClelland, 1975).

The influence of implicit motives in romantic or companionate relationships has been studied intensively. However, research about the role of implicit motives in fatherhood is rare, even though a lot of men become fathers or adopt a paternal role at some point in their lives (Martinez, Daniels, & Chandra, 2012). Chasiotis and colleagues (2006) reported the implicit prosocial power motive to be positively related to the explicit love for children. The latter, in turn, was a significant predictor of becoming a parent. Peterson and Stewart (1993) found affiliation to be significantly related to the number of children and the amount of parenting involvement, but in women only. Interestingly, they also found a significant interaction of both affiliation and power motive. In women, a concurrence of low affiliation and low power motive was associated with less interest in parenting involvement. Several studies on the influence of implicit motives did not investigate parenthood directly but rather measured the degree of

generativity, an important developmental life stage (Erikson, 1963). Generativity can be defined as a concern in establishing and guiding the next generation (Erikson, 1963). Therefore, becoming a parent is an important way to promote generativity (Snarey, Son, Kuehne, Hauser, & Vaillant, 1987). McAdams, Ruetzel, and Foley (1986) interviewed participants and had them write future-oriented texts. Power and intimacy motivation in participants' texts were positively correlated with the amount of generative content in the interviews. Furthermore, implicit prosocial power motivation was associated with more generative concern, which was directly linked to higher global life satisfaction (Hofer et al., 2008).

However, not only the willingness to take over a paternal role should be considered but also the way men experience fatherhood. Father's subjective view of their parental role could influence their parental involvement as well as their own health and well-being. Parenting is a challenging task and includes varying amounts of effort. A few decades ago, fulfilling the role as the family's breadwinner was a father's main responsibility (Goldscheider & Waite, 1991). Nowadays, fathers are expected not only to provide sufficient financial income but also to be actively engaged in family life and highly involved in childcare (Henwood & Procter, 2003). The demands of fatherhood can interfere with individual requirements such as work-related or social activities besides family life. As a consequence, fatherhood has been shown to have high impact on men, both in terms of benefits and costs such as increased work-family conflicts (Aassve, Goisis, & Sironi, 2012; Evenson & Simon, 2005; Nelson, Kushlev, English, Dunn, & Lyubomirsky, 2013; Nomaguchi, 2009; Zimmermann & Easterlin, 2006). According to the Role Strain Theory (Goode, 1960), occupying multiple and competing roles as employee, spouse, and father causes strain and has been associated with poorer health outcomes (Sekine, Chandola, Martikainen, Marmot, & Kagamimori, 2006; van Hooff et al., 2005). Moreover, fathers report more financial restrictions and constraints in social life (Claxton & Perry-Jenkins, 2008; Stanca, 2012; Wrzus, Hänel, Wagner, & Neyer, 2013). These constraints due to parenthood may increase psychological distress and may provoke psychopathological maladjustment such as depressive mood (Evenson & Simon, 2005; Umberson, Pudrovska, & Reczek, 2010). They can also be harmful for parents' romantic relationship resulting in lower marital satisfaction (Twenge, Campbell, & Foster, 2003).

Nevertheless, fatherhood is also regarded as beneficial. Several studies reported associations between parenthood and positive outcomes such as higher life satisfaction and overall well-being (Eggebeen & Knoester, 2001; Nelson et al., 2013; Nomaguchi & Milkie, 2003; Pleck, 1997). According to Role Enhancement Perspective, an individual's role is a source of meaning and purpose (Simon, 1997; Burton, 1998) and occupying multiple roles

provides benefits in terms of emotional gratification, increased resources, and higher psychological well-being (Ahrens & Ryff, 2006; Sieber, 1974). Correspondingly, fatherhood had a potentially buffering effect against work-related stress (Barnett, Marshall, & Singer, 1992; Haar & Bardoel, 2008). Moreover, holding a strong parental role identity and having positive role perceptions were related to the amount and quality of parenting behavior (Bronte-Tinkew, Carrano, & Guzman, 2006; Rane & McBride, 2000; Stone & McKenry, 1998). In conclusion, occupying a paternal role is accompanied by varying degrees of perceived constraint as well as fulfillment and in turn, has negative or positive consequences for men's well-being.

A number of factors influence parenting behavior and the individual adaption to a positive father role. Belsky (1984) assumed that fatherhood is affected not only by contextual factors, such as marriage status, employment situation, or living conditions, but also by child and father characteristics. The demands of parenting young children may outweigh the rewards associated with parenthood (Nelson et al., 2013; Umberson et al., 2010). Particularly during the time of co-residing with young children, parents reported lower psychological well-being (Evenson & Simon, 2005). Similarly, parental age was found to be a moderator of the relationship between parenthood and life satisfaction. Whereas parents younger than 25 years were less satisfied with their lives compared to the same age group without children, parents aged 26 to 62 years reported significantly higher life satisfaction than their childless counterparts (Nelson et al., 2013). Parents aged 60 years or above reported less depression compared to childless adults of the same age (Chou & Chi, 2004). Working hours were found to be negatively associated with father involvement (Roeters, van der Lippe, & Kluwer, 2009), whereas highly educated fathers spent significantly more time with their children compared to less educated fathers (Yeung, Sandberg, Davis-Kean, & Hofferth, 2001). However, parents with a high socio-economic status (SES) experienced fewer subjective benefits and less fulfillment in parenthood compared to parents with a low SES (Kushlev, Dunn, & Ashton-James, 2012; Veroff, Douvan, & Kulka, 1981).

Up to now, paternal involvement and well-being have been investigated in the context of sociodemographic characteristics, whereas little is known on the role of a man's subjective experience of his paternal role as being constraining or fulfilling. Implicit motives as part of men's personality are likely to be associated with their perception of fatherhood. The father-child relationship may provide incentives that are rewarding for men with certain motives.

Present Research

This study aims to explore the role of implicit motives in fatherhood. *Perceived constraint due to fatherhood* measures the degree to which a father experiences negative consequences of his paternal role. We assume, that a father's perceived constraint is influenced by implicit motives since they affect subjective experiences, such as perception, cognition, and affect (Deaux & Snyder, 2012; McClelland et al., 1989). Individuals with a high need for affiliation derive pleasure from engaging in relationships such as the one between a father and his child (Schultheiss, 2008). Taking care of a child or children could be a way to satisfy a father's need for affiliation. Therefore, we hypothesize that highly affiliation motivated fathers perceive less constraint, resulting in higher life satisfaction.

Peterson and Stewart (1993) argued that power motivation could be relevant in parenthood, since the parent-child relationship is authoritative rather than affiliative in nature. Moreover, fatherhood is a form of generativity (Snarey et al., 1987), which has consistently been linked to implicit power motivation. Therefore, we also expect to find less perceived constraint and consequently higher life satisfaction for fathers with a strong implicit need for power.

7.2 Material and Methods

We collected data as part of a larger cross-sectional project on the costs and benefits of fatherhood across lifespan. We conducted the project within the Central European Network on Fatherhood (CENOF). In the following, we describe only procedures and measures used for the present study. For more detailed information about the larger cross-sectional project see Waldvogel and Ehlert (2016).

Participants and Procedure

Participants for the larger project were recruited in 2014 in all German-speaking countries of Middle Europe. Recruitment process included broadcast and newspaper announcements, online advertisements, mailing lists, and flyer distribution. Inclusion criteria for participation were male sex, age of 18 years or older, and occupying a paternal role for a child. Participants did not receive financial remuneration. Instead, four vouchers for leisure activities were drawn among all participants. The local Ethics Committee of the Faculty of Arts at the University of Zurich approved the study protocol before data collection. All participants provided an online informed consent. Data collection was divided into two parts and carried out online with respect to anonymity. First, we obtained sociodemographic information (e.g., father's education) as well as psychometric and health data. Additionally, participants answered questions about their

children (e.g., child's age), their involvement in childcare (e.g., amount of time spent with children), and attitude toward fatherhood (e.g., perceived constraint). After completion of the first online survey, men were asked for their participation in the second part of the study and invitations were sent upon agreement. A total of 560 men participated in the online assessment of implicit motives. Participants were debriefed about the purpose of the motive assessment after its completion and were asked for their consent to use the data.

The present sample consisted of fathers (N = 276) who had biological children with one child mother, exclusively. All participants were in a stable relationship with the child's mother. In addition, the couple lived in the same household as at least their youngest child. Participants had an average age of 39.34 years (SD = 6.68) with 72% having Swiss, 16% German, and 9% Austrian citizenship. Sixty-three percent of the sample had undergone tertiary education. Only 9% of the fathers were employed part-time.

Measures

The Picture Story Exercise (PSE) is a standard story-writing instrument to measure participants' *implicit motive dispositions* (Schultheiss & Pang, 2007). For this study, participants were shown six commonly used pictures to arouse implicit motives (Pang & Schultheiss, 2005; Smith, 1992). Each picture depicted a social situation with several characters involved. The pictures used were: boxer (McClelland & Steele, 1972), couple by river, ship captain, trapeze artists, women in laboratory (Smith, 1992), and nightclub scene (McClelland, 1975). We presented each picture for 10s in a random order. After each picture, participants had four minutes to write an imaginative story about the scene depicted. Standard instructions and procedures were used as described in Smith (1992). The PSE could be run on any computer with an Internet connection. Measurements derived from online and paper-and-pencil versions of the PSE offer comparable results (Bernecker & Job, 2011; Schultheiss, Liening, & Schad, 2008). We simultaneously coded stories for themes of affiliation (*n*Aff) and power (*n*Pow) using the Manual for Scoring Motive Imagery in Running Text (Winter, 1994). Affiliation imagery is defined as a concern with establishing, maintaining, or restoring friendly relations and was scored whenever a character expresses positive intimate feelings toward others, shows sadness about a separation, engages in affiliative activities, or nurturing friendly acts. Power imagery is coded whenever a character shows a concern with having impact or influence on others. It is scored whenever a character engages in strong, forceful actions, arouses an emotional reaction in others, provides unsolicited help or support, or tries to control, influence, or impress others. Two independent coders scored each story without knowledge about participants' other characteristics. Both coders previously received training for coding motive content in written

text. Each sentence was coded for motive imagery. Following recommendations by Schultheiss and Pang (2007), coders had several hours of scoring practice and have established at least 85% of interrater agreement on expert codings of calibration materials provided by Schultheiss (2015). Inter-rater reliability was estimated by Pearson correlations and was r = .91 for affiliation and r = .81 for power. We averaged scores for further analyses.

On average, participants wrote 486 words (SD = 129). Since story length was significantly correlated with the amount of motive imagery ($r \geq .40$, p = .000), we used regression analyses to residualize motive scores for word count in order to remove the influence of verbal fluency (Schultheiss & Pang, 2007). We converted residuals to z-scores and used them in subsequent data analyses.

Fathers rated the degree of *perceived constraint due to fatherhood* on a visual analog scale ranging from 0 ("not at all") to 100 ("very"). Specifically, they were asked "How much do you feel that fatherhood constrains you?"

In order to assess *life satisfaction*, participants answered the question "In general, how satisfied are you with your life?". They rated their degree of life satisfaction on a visual analog scale with 0 indicating "not satisfied at all" and 100 indicating "very satisfied". Previous research showed that single-item measures of life satisfaction have acceptable reliability (Lucas & Donnellan, 2012).

Statistical Analyses

Statistical analyses included several steps and were performed using the IBM Statistical Package for the Social Sciences (SPSS Version 22 for Windows). Statistical significance was defined as $p < .05$. We tested possible control variables estimated from literature for associations with main study variables by analyzing correlations. Paternal employment status and education were significantly correlated with life satisfaction (r = .14, p = .02) and perceived constraint (r = .12, p = .04), respectively. Perceived constraint was further related to age of child (r = -.16, p = .01), which in turn was highly correlated with age of father (r = -.71, p = .000). Therefore, we entered these control variables in all further analyses.

First, partial correlations between the main independent and dependent variables were computed, controlling for the above mentioned variables. Next, mediation analyses were computed to investigate the mediating effect of perceived constraint in the relationship between the predictors (*n*Aff and *n*Pow) and the outcome (life satisfaction). There are different statistical methods to test for mediation. The causal steps approach by Baron and Kenny (1986) has been

widely used. However, it has been criticized in recent years due to several reasons such as lacking statistical power (Hayes, 2009; MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). Instead, Preacher and Hayes (2008) suggest using a bootstrapping approach to test for mediation. Especially for small to moderate sample sizes ($N < 400$) bootstrapping is suggested to have the greatest statistical power to detect mediation (McCartney, Burchinal, & Bub, 2006). Furthermore, Preacher and Hayes (2004) argue that there still might be indirect effects despite the non-significance of the relationship between predictor and outcome, which is the case for the present data. We used the SPSS script provided by Hayes (2015) to run the mediation analyses. We set bootstrapping to k = 10'000 and computed 95% confidence intervals.

In a final step, we used the AMOS 23.0 software package to run structural equation modeling. Again, bootstrapping was set to k = 10'000 and 95% bias-corrected bootstrap confidence intervals were computed (Preacher & Hayes, 2008). We applied a maximum-likelihood-technique and assessed the model fit using the χ^2 statistic and other commonly used model fit indexes. In this study, a model was considered to have a good fit if all path coefficients were significant at the level of $p < .05$, χ^2/df was < 2.5 (Bollen, 1989), RMSEA ≤ 0.05 (Steiger, 1990), and SRMR < 0.08 (Hu & Bentler, 1999). TLI and IFI indicate good model fits if they exceed 0.9 (Bollen, 1989; Hu & Bentler, 1999).

7.3 Results

Descriptives and Partial Correlations

Descriptives and inter-correlations among the main study variables are shown in Table 1. Perceived constraint was negatively correlated with *n*Aff ($r = -.14$, $p = .03$) and life satisfaction ($r = -.24$, $p = .000$) and showed a positive, significant relationship with *n*Pow ($r = .13$, $p = .04$).

Table 4. Descriptive statistics and inter-correlations among the relevant variables

	Mean	SD	1	2	3	4
1. Life satisfaction	80.83	13.61	1			
2. Perceived constraint	41.15	27.34	-0.24**	1		
3. Affiliation (*n*Aff)[a]	7.33	3.23	0.06	-0.14*	1	
4. Power (*n*Pow)[a]	3.81	2.14	0.01	0.13*	-0.07	1

Note. $N = 276$. Control variables: child's age, paternal age, paternal education, paternal employment.

SD: standard deviation.

[a] Raw motive scores are presented for descriptive statistics.

Significance levels (two-tailed): * $p < .05$, ** $p < .001$.

Mediation Analyses

Next, we were interested in the mediating effect of perceived constraint in the relationship between the predictors (*n*Aff and *n*Pow) and the outcome (life satisfaction). Age of child and father as well as paternal education and employment status were entered as control variables. Mediation analyses confirmed the significant relationships between predictors and mediator and between mediator and outcome. Moreover, they provided evidence for the mediating role of perceived constraint. The regression of life satisfaction on *n*Aff was not significant, $b = .86$, $t(270) = 1.08$, $p = .28$. The regression of the mediator perceived constraint on *n*Aff was significant, $b = -3.65$, $t(270) = -2.24$, $p = .03$. The mediator perceived constraint, controlling for *n*Aff, was significantly related to life satisfaction, $b = -.12$, $t(269) = -3.97$, $p = .000$. *n*Aff, controlling for the mediator, was not a significant predictor of life satisfaction, $b = .42$, $t(269) = .61$, $p = .61$. The bootstrapped unstandardized indirect effect was $b = .44$. The 95% confidence interval ranging from .10 to .96 did not include zero, thus the indirect effect was statistically significant and mediation can be assumed (Preacher & Hayes, 2004).

The regression of life satisfaction on *n*Pow was not significant, $b = .17$, $t(270) = 0.19$, $p = .85$. The regression of the mediator perceived constraint on *n*Pow was significant, $b = 3.41$, $t(270) = 2.11$, $p = .04$. The mediator perceived constraint, controlling for *n*Pow, was significantly related to life satisfaction, $b = -.13$, $t(269) = -4.14$, $p = .000$. *n*Pow, controlling for the mediator, was not a significant predictor of life satisfaction, $b = .59$, $t(269) = .74$, $p = .46$. The indirect effect was $b = -.43$, 95% *CI* [-.99, -.07], giving evidence for the mediating role of perceived constraint.

Structural Equation Modeling

In order to test the indirect effects of affiliation and power on life satisfaction via perceived constraint in an overall model, we applied structural equation modeling. Our model consisted of one endogenous variable (life satisfaction) and three exogenous variables (*n*Aff, *n*Pow, and perceived constraint), controlling for the previously mentioned variables. Since a father's employment was associated with life satisfaction only, we modeled a single direct path from employment to life satisfaction. For child's age and paternal education only direct paths to perceived constraint were allowed, because the relationship with life satisfaction was not significant. Paternal age was not significantly related to any outcome. Moreover, we encountered the problem of multicollinearity (Grewal, Cote, & Baumgartner, 2004), since paternal age was highly correlated with child's age ($r = .71$, $p = .000$). Therefore, we modeled a second structural equation model without paternal age. Excluding paternal age from analyses showed no substantial drop in model fit indices. The final model is shown in *Figure 1*. The results showed that the model had a very good fit to the data: χ^2 (5, $N = 276$) = 2.238, $p = .815$; $\chi^2/df = 0.448$; RMSEA = 0.000 (0.000, 0.051); SRMR = 0.015; TLI = 1.335; and IFI = 1.055.

Direct and indirect effects are shown in Table 2. The indirect effect of affiliation on life satisfaction was $b_{stand} = 0.030$ (0.007, 0.067), $p = .01$. In the same model, the indirect effect of power on life satisfaction was $b_{stand} = -0.027$ (-0.065, -0.003), $p = .03$. The standardized regression weights indicate small to medium effect sizes within our model (Cohen, 1990). The overall model accounted for 8% variance in perceived constraint and 7% variance in life satisfaction.

Table 5. Direct and indirect effects and 95% confidence intervals for the overall structural equation model

			95% CI		
	B	*SE*	Lower bound	Upper bound	*p*
Direct effects:					
AFF → PC	-0.131	0.051	-0.232	-0.034	0.008
POW → PC	0.115	0.057	0.002	0.225	0.047
PC → LS	-0.232	0.063	-0.349	-0.105	0.000
Indirect effects:					
AFF → PC → LS	0.030	0.015	0.007	0.067	0.006
POW → PC → LS	-0.027	0.015	-0.065	-0.003	0.030

Note. N = 276. Control variables: child's age, paternal education, paternal employment.

AFF: Implicit affiliation motive; POW: Implicit power motive; PC: Perceived constraint; LS: Life satisfaction

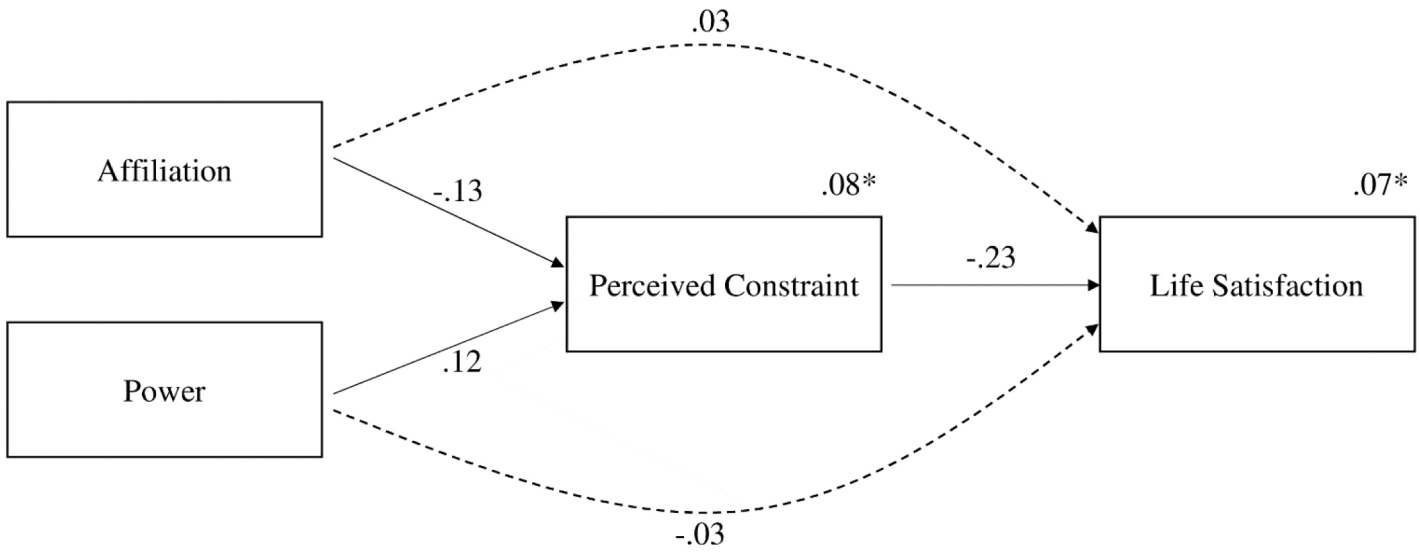

Figure 6. Structural equation model showing direct and indirect effects of implicit motives on perceived constraint and life satisfaction. Solid arrows indicate direct effects. Dashed arrows show indirect effects of affiliation and power on life satisfaction through the mediator perceived constraint. Numbers adjacent to arrows are standardized regression coefficients ($p < .05$). Control variables (not shown): child's age, paternal education, paternal employment.

* Variance explained by predictors

7.4 Discussion

The purpose of the present study was to investigate the influence of implicit motives on men's perceived constraint due to fatherhood and their effect on men's life satisfaction. Our study was the first to show that the implicit motives for affiliation and power have a significant direct impact on men's subjective experiences in fatherhood. Moreover, perceived constraint acted as a mediator in the relationship between fathers' implicit motives and their satisfaction with life. As assumed in our first hypothesis, the implicit motive for affiliation was negatively related to perceived constraint. Therefore, fathers with a stronger need for affiliation reported being less constrained due to their paternal role. This, in turn, led to more life satisfaction. Our second hypothesis stated a negative relationship between implicit power motivation and perceived constraint. Interestingly, the results showed a positive association such that fathers with a high implicit power motive reported more perceived constraint, which lowered their life satisfaction.

The present findings can be embedded in previous research. Showing affiliative behavior will result in positive affect in individuals motivated for affiliation since they achieve motive satisfaction (Brunstein, 2006; McAdams & Bryant, 1987). The father-child relationship seems to provide incentives, which are affectively desirable for affiliation motivated men since they can satisfy their motive within this relationship. In line with the Motive Disposition Theory (McClelland, 1985), a stronger motivation provides more capacity for motive satisfaction. Therefore, if highly affiliation motivated men are provided with opportunities to satisfy their implicit motivation in fatherhood they experience more positive affect and less constraint. It has to be further analyzed which kind of incentives within the father-child relationship might be particularly rewarding for high *n*Aff men such as traditional caregiving or playing.

Our results suggest that affiliation motivation potentially buffers against the negative consequences of fatherhood. These findings can be linked to research on the hormonal basis of social behavior. The hormone progesterone was positively related to both social bonding and affiliative behavior as well as implicit affiliation motivation (Brown et al., 2009; Edelstein, Wardecker, Chopik, Moors, Shipman, & Lin, 2014; Mehta & Josephs, 2011; Schultheiss et al., 2003a; Schultheiss et al., 2004; Wirth & Schultheiss, 2006). Schultheiss and colleagues (2004) found increases in salivary progesterone levels after participants watched a movie, which aroused implicit affiliation. Therefore, implicit affiliation could be related to higher baseline levels of progesterone in fathers as well. Furthermore, engaging in motive-congruent affiliative behavior such as child interaction should then not only induce positive affect (McClelland,

1985) but also increase fathers' progesterone levels and therefore may strengthen the father-child relationship. However, these assumptions still need to be tested in future studies.

Our hypothesis regarding the influence of implicit power on men's perception of fatherhood was not supported by the present results. In our study, we assessed general implicit power motivation. Since *n*Pow can be realized not only in an antisocial, more dominant way but also in a prosocial manner (McClelland, 1975), it could be important to differentiate the two domains. The few studies, which investigated implicit power motivation in the context of parenthood or generativity either used a general measure of *n*Pow (McAdams et al., 1986; Peterson & Stewart, 1993) or concentrated specifically on implicit prosocial power motivation (Chasiotis et al., 2006; Hofer et al., 2008). Consequently, fatherhood might not provide the incentives that are affectively rewarding for high *n*Pow men, as the dominant aspects of implicit power are best satisfied in a hierarchical relationship structure. These hierarchical structures, for example, more often occur at the work place. Furthermore, the time and energy invested in the paternal role decreases the investment of both resources for men's role at work. Thus, even fewer possibilities for power motive satisfaction are available, resulting in negative affect (McClelland, 1985). Following this interpretation, it is unsurprising that highly power motivated men feel more constraints due to their paternal role than fathers low in implicit power.

Our results can also be linked to studies on the hormone testosterone. Research assumes that social bonding suppresses testosterone to ensure sensitive parental behavior (Mazur & Michalek, 1998; Mehta & Josephs, 2011; van Anders, Goldey, & Kuo, 2011). Implicit power motivation, however, was positively related to testosterone levels (Schultheiss et al., 2004; Schultheiss, 2007) and power motive satisfaction lead to an increase in testosterone (Schultheiss et al., 2005). Therefore, a high implicit power motive in fathers might be related to higher testosterone levels or higher testosterone reactivity. This in turn, might have adverse effects on nurturing parenting behavior, resulting in more perceived constraint.

The influence of both implicit affiliation and power motive on perceived constraint can be discussed within Role Identity Theory. The impact of occupying multiple roles on an individual's well-being is still unclear (Ahrens & Ryff, 2006; Sekine et al., 2006). Apart from the quantity of roles, the salience or importance of each role for a person has to be considered. Rane and McBride (2000) had fathers rate how central the nurturing role was for their sense of self. Fathers who reported higher centrality were significantly more involved with their children. Moreover, health and well-being is positively influenced by strong and positive role perceptions (Martire, Stephens, & Townsend, 2000; Pleck, 1985). Applying these results to the subject of the present study, we assume that fathers with a high implicit motive for affiliation

should also perceive and value their paternal role as more important for their identity since engaging in this role is satisfying for their underlying motivational needs. This positive role evaluation could have led to a more positive perception of fatherhood.

However, this may not apply to highly power motivated individuals. Men with a high implicit dominant power motive may strongly identify with their role as employee or employer, which ideally gives them diverse opportunities to engage in power-oriented behavior. Conversely, their evaluations of their paternal role might be less positive compared to their employee or employer role. Especially since it diminishes resources that could have previously been invested in their role at work. Nevertheless, occupying the roles as a parent and worker might not be generally responsible for worse outcomes. Jutras and Veilleux (1991) found that men who combined the role of caregiver with other family roles experienced a higher subjective burden than women who combined these roles. Accordingly, research might have to distinguish the different role combinations as it could be important which roles are occupied at the same time. High *n*Pow men might not experience role strain as long as the power motive is satisfied within any of their roles.

Our findings on the influence of subjective experiences on life satisfaction are in accordance with research showing that the positive effects of parenthood on life satisfaction might be overshadowed by the costs of children, both in terms of finances and time (Pollmann-Schult, 2014). Fathers who were highly motivated for power seem to have experienced increased costs due to their paternal role, which led to lower life satisfaction. Implicit affiliation, however, had a buffering effect against the negative experiences in fatherhood and fathers were then more satisfied with their lives. Concluding, we were able to demonstrate different influences of affiliation and power motivation on men's perceptions of their paternal role and their well-being.

Several limitations of this study should be discussed. First, due to the cross-sectional design of the study, our results cannot be interpreted in terms of causal directionality. However, the presumed causal directions are the most theoretically plausible. Nevertheless, we cannot rule out the possibility that men who enter parenthood differ from men who remain childless in regard to the strength of their implicit motives. For example, men with a high implicit motive for affiliation seek relationships and might be more willing to become a father in order to establish a deeper bond to their partner as well as a new relationship to their child. Alternatively, the transition to parenthood and the child's or children's upbringing might change a man's implicit motives since they are shaped by strong emotional experiences. Longitudinal studies

are needed to compare fathers to non-fathers over lifespan and to investigate if highly emotional life events, such as becoming a parent, alter men's implicit motives.

A second limitation concerns the measurement methods. For both perceived constraint and life satisfaction we used a single visual analog scale. This has proven to be a valid measure for life satisfaction (Lucas & Donnellan, 2012). However, we observed a ceiling effect in our data, probably due to a selection or social desirability bias. Future studies could consider using measures, which consist of several items such as the Satisfaction with Life Scale (Diener et al., 1985). To our knowledge, this was the first study to apply this type of measure for perceived constraint. Most previous studies on parental experiences were qualitative in nature and conducted interviews with participants (e.g., Baruch & Barnett, 1986; Blair-Loy, 2003; Maridaki-Kassotaki, 2000; Silverstein, Auerbach, Grieco, & Dunkel, 1999). Not only was our single measure more time and cost efficient but, due to our anonymous online survey, we could also reduce the risk of a socially desirable response pattern. Studies have consistently shown that face-to-face interviews increase the probability of socially desirable responses compared to self-completion measurements (Richman, Kiesler, Weisband, & Drasgow, 1999; Tourangeau & Yan, 2007). In a meta-analysis, computerized surveys as applied for the present study produced the most truthful responses (Gnambs & Kaspar, 2015). It could be informative, though, to add further items, which assess different types of constraint (e.g., financial or time constraint) in order to receive a more comprehensive measure of perceived constraint (e.g., Scott & Alwin, 1989). Furthermore, future research may want to add objective constraint, such as assessments from independent observers, as a control variable. Nevertheless, research shows that subjective ratings are relevant in predicting outcomes (DeSalvo, Bloser, Reynolds, He, & Muntner, 2006; Rasmussen, Scheier, & Greenhouse, 2009). Therefore, we encourage the use of subjective measurements in future research.

As previously mentioned, the PSE applied in this study revealed the strength of a general implicit power motive only. However, power motivation can be enacted in a more dominant, aggressive way or in a prosocial manner (McClelland, 1975). Different results might be obtained by distinguishing these two components of implicit power motivation. However, post-hoc analyses with the present data revealed no significant results for individual subcategories of implicit power motivation. Furthermore, while both implicit affiliation and power motive had an independent effect on perceived constraint, their interaction effect yielded no significant result. Nevertheless, future studies might still consider analyzing these different aspects of implicit motivation and their relation to fathers' perceived constraint.

Finally, the homogeneity of the analyzed sample has to be taken into account. We exclusively focused on biological fathers in traditional family structures. However, alternative

and more complex family structures have emerged in the past years (Parke, 2013). It is unclear to which degree our results can be generalized for other types of modern fatherhood such as social, adoptive, or step fathers.

This is the first study showing that implicit motives shape men's experiences in fatherhood. Implicit affiliation motivation had a buffering effect on fathers' perceived constraint and a positive indirect influence on their life satisfaction. In contrast, men who had a stronger implicit need for power reported a higher degree of constraint due to fatherhood and were less satisfied with their lives in general. Our study highlights the importance of providing congruent motivational incentives for an individual's well-being. As a practical implication, finding opportunities to satisfy men's implicit motives could improve their subjective experiences in fatherhood and their well-being.

Part III: General Discussion

8. Summary of Findings

The empirical studies presented in the second part of this thesis provided new evidence for the role of implicit motives in the experience of stress and men's mental health. In study 1, the relationship between vital exhaustion and subtypes of chronic stress was analyzed in detail. Work-related stress but also social stress was positively associated with symptoms of vital exhaustion. Moreover, implicit motives were diversely involved in this process. Implicit affiliation was negatively related to chronic stress and vital exhaustion but through higher perceived social support only. Moderation analyses further confirmed that *n*Affiliation can have negative effects on mental health when this need is paired with motive-relevant stress (e.g., social isolation). While implicit power was unrelated to stress and health in this study, *n*Achievement was linked to lower perceived stress and vital exhaustion. Structural equation modeling revealed that there was an indirect mechanism via increased social support in achievement motivated individuals. Achievement further moderated the relationships between chronic stress, namely work discontent and social isolation, and vital exhaustion. These results highlight the relevance of implicit motives in work-related and social stress and mental health.

Study 2 focused on perceived chronic stress in a sample of fathers. Perceived chronic stress was operationalized by men rating the degree to which they felt that fatherhood constrained them. Results indicate that perceived constraint due to fatherhood was negatively linked to general life satisfaction. Men with a higher motive for affiliation reported less constraint while implicit power motivation led to a more negative subjective experience of fatherhood. We further found a mediating effect of perceived constraint in the relationships between implicit motives and life satisfaction, resulting in a positive indirect effect of *n*Affiliation and a negative indirect effect of *n*Power on life satisfaction. These findings show that implicit motives influence men's experiences in their paternal role and provide an indication as to how well-being in fatherhood can be achieved.

9. Discussion and Integration of Findings

Each empirical study is discussed in detail in the relevant chapters in the previous part of this thesis. In the following, the findings from both studies will be integrated within the larger topic of this thesis and discussed with respect to the aims and research questions described in chapter 5.

Several authors have suggested that the physiological stress response and stress-related consequences may depend on the specific type of stress (e.g., Miller et al., 2007). Therefore, one aim of the present thesis was to investigate different sources of chronic stress and their relation to an individual's mental health. The findings suggest that the perception of chronic stress in work, family, and social life are relevant for the well-being and mental health of middle-aged men. The first study was concerned with symptoms of vital exhaustion, which overlaps with the more researched state of burnout. These similarities are likely to be due to the emotional exhaustion component of burnout (Kudielka et al., 2006). In research on burnout, though, the focus is largely on stress in the occupational domain as it is defined as a work-related construct (Bianchi, Schonfeld, & Laurent, 2015). Previous findings on emotional exhaustion found positive correlations with job demands, work overload, work pressure, and job dissatisfaction (Görgens-Ekermans & Brand, 2012; Lee & Ashforth, 1996; Qaiser, Gulzar, Hussain, & Shabbir, 2015; Turnipseed, 1994). However, it has to be kept in mind that emotional exhaustion only partly reflects the psychological concept of vital exhaustion. Regarding vital exhaustion, only one earlier study on work stress exists (Schnorpfeil et al., 2002). Therefore, the present findings added to the sparse literature on the association between stress and vital exhaustion. Both quantitative work stress (i.e., work load and demands at work) and qualitative work stress (i.e., work discontent) showed strong links to higher vital exhaustion. Hence, occupational stress might be a risk factor for the development of vital exhaustion. Moreover, the analyses emphasized the relevance of social aspects in vital exhaustion. Social relationships are an important resource, particularly in coping with stress. In the first study, social support protected an individual from experiencing chronic stress. In contrast, lack of social contact or social conflicts are related to impairments in mental and physical health (Brummett et al., 2001; Falger & Schouten, 1992; Heikkinen & Kauppinen, 2004; Wilson et al., 2007; Cornwell & Waite, 2009). Social stress can occur both at the workplace, in relationships in general, and in family life in particular. Study 1 expanded the current literature by showing positive associations between social stress (i.e., lack of social contact and lack of social recognition) and vital exhaustion. The second study revealed that paternal stress (i.e., perceived constraint)

contributed to men's satisfaction with life. Similarly, fatherhood has been associated with costs for fathers in terms of time and financial restrictions and poorer health (Claxton & Perry-Jenkins, 2008; Stanca, 2012; Umberson et al., 2010; Wrzus et al., 2013). Nevertheless, several studies have proposed a beneficial effect of fatherhood on men (Eggebean & Knoester, 2001; Nomaguchi & Milkie, 2003; Nelson et al., 2013). These divergent results suggest that there are interindividual differences in the adaptation to and experience of one's paternal role (Belsky, 1984).

This is in line with the transactional theory of stress, which states that stress is the result of an interaction between environmental demands and the person exposed to these demands (Lazarus, 1977). An individual's traits, cognitions, and motivation are involved in the occurrence and consequences of stress through numerous pathways (see chapter 3.6). Therefore, the main aim of this thesis was to examine the potential role of implicit motives in these processes. Implicit motives should be particularly relevant for stress and health as they are strongly connected with emotional reactions (Schultheiss, 2008). Being able to show motive-relevant behavior satisfies an implicit need and results in intrinsic pleasure (Brunstein, 2006). However, motive frustration will be followed by negative affect. Hence, the degree to which an individual can fulfill their needs in their different life domains could determine the individual degree of chronic stress. Furthermore, implicit motives might influence if an individual will develop negative health consequences in the face of stress, depending on the interaction between the motive and the specific type of stress.

Both studies provided evidence that implicit motives influenced the appraisal of a stressor and correspondingly the experience of stress. In the first study, men's perceived chronic stress was directly affected by their degree of implicit affiliation and achievement. In the second study, the implicit need for affiliation and power had an impact on the perception of constraint due to their paternal role. However, the influence of affiliation differed in the two samples. Affiliation motivated fathers reported lower degrees of constraint and consequently higher life satisfaction. In the other sample, though, affiliation led to higher chronic stress and vital exhaustion. These divergent findings are likely to be the result of the interaction between the motive and the situation at hand. Apparently, fatherhood offers incentives to satisfy affiliative needs (e.g., playing with your child). Therefore, these men do not experience their paternal role as stressful. The authors of an experimental study found similar evidence. In a socio-evaluative situation, affiliation buffered the physiological stress reaction (Wegner et al., 2014). The same did not hold true for physical stress or neutral conditions. They conclude that the social aspects of the first condition were not threatening for an affiliation-motivated individual, and would thus not

be perceived as stressful. Generally, though, the results of the first study suggest that it was difficult for these men to fulfill affiliative needs, which is expressed in higher perceived chronic stress. Moderation analyses offered a potential explanation. The findings revealed that a higher workload is particularly burdensome for affiliation-motivated men as this may result in fewer opportunities to show affiliative behavior. In terms of health promotion, these results further emphasize the need to create a balance between work and social life. Additionally, affiliative needs could be fulfilled by providing opportunities for social interaction at the workplace (e.g., team work).

The moderation analyses in the first study confirmed the reactivity hypothesis of personality (Wiebe & Smith, 1997). That is, individual differences in implicit motive strength influenced the response to motive-relevant stress. In addition to the moderating effect mentioned in the previous paragraph, a lack of social contact only led to higher ratings of vital exhaustion when implicit affiliation was substantial. Likewise, McAdams and Bryant (1987) reported that women with a high need for intimacy-affiliation expressed less gratification and more uncertainty when they were living alone. Similar conclusions as stated above can be drawn in terms of stress prevention.

Despite these negative findings, the first study also added a psychological perspective to the beneficial effects of affiliation on health that were reported in previous research (e.g., Jemmott et al., 1983). According to the tend-and-befriend theory, some individuals turn to social bonding when exposed to stressful circumstances as it promotes adjustment to the stressor (Taylor, 2009). The present findings provided first evidence that the implicit motive for affiliation was linked to increased support seeking behavior and higher perceptions of social support, which in turn lowered chronic stress and vital exhaustion. As the overall effect suggests, implicit affiliation can buffer against the experience of stress and stress-related adverse health states when possibilities to fulfill affiliative needs are available to a person.

Deriving from previous research, achievement was hypothesized to play a significant role in the work environment. For example, achievement was linked to better job performance and success (Baruch et al., 2004; McClelland, 1965; McClelland, 1987). Individuals high in achievement should interpret tasks as challenging rather than stressful since they offer possibilities to satisfy their achievement-related needs. In experimental studies, *n*Achievement predicted dampened cortisol reactivity in response to a stressor (Kirschbaum et al., 1993; Schultheiss et al., 2014; Yang et al., 2015). The authors concluded that achievement motivated individuals appear to have a better stress regulation. In study 1, men motivated for achievement did indeed report lower levels of chronic stress and vital exhaustion. Similarly, lower levels of

implicit achievement were found in opiate users and in patients with depressive symptoms (Bársonya et al., 2013; Musty & Kaback, 1995; Neumann & Schultheiss, 2015). However, in study 1, the negative influence of achievement on stress was an indirect relationship as those men higher in *n*Achievement also perceived significantly more social support. Conversely, implicit achievement had an impact on reactivity to stress by increasing the negative association between lack of social contact and symptoms of exhaustion. Taken together, the present findings suggest that implicit achievement should receive more attention in the study of social relationships. Most research has confined the role of achievement to the context of competition or task-solving (e.g., Kordik, 2011). Only few individual findings exist that let assume that social cues are relevant for fulfilling achievement-related needs. For example, receiving feedback from others is necessary to improve one's performance (Brunstein & Maier, 2005). Nevertheless, the finding that men motivated for achievement are more likely to perceive social support is unlike other studies reporting a more ego-oriented behavior in leaders high in *n*Achievement (House & Aditya, 1997; Spangler et al., 2014). Arguably, the behavior shown by achievement motivated individuals depends on the situation at hand. Future research is needed to clarify the role of implicit achievement in the social environment, particularly in terms of social stress.

In the first study, *n*Power was unrelated to the perception of stress, social support, and signs of vital exhaustion. These findings let assume that implicit power motivation is not associated with the appraisal and experience of stress and the development of vital exhaustion. This is in contrast to consistent findings linking implicit power to higher sympathetic activity, and thus impairments in health (Hall et al., 2010; McClelland, 1979; McClelland et al., 1982). However, these studies emphasize that the negative health effects are usually found when the motive for power was frustrated, that is, when power motivated individuals experienced motive-relevant stress. In this light, it is even more surprising that no effects were found even though several different types of work and social stress were investigated in study 1. Further studies are needed to explore the potential influence of implicit power in psychosocial chronic stress, particularly in the context of work.

In the second study, though, fathers' implicit motive for power was positively related to their degree of perceived constraint. This indicates that for high *n*Power individuals, fatherhood does not offer corresponding incentives for motive satisfaction. Implicit power has been linked to the steroid hormone testosterone (e.g., Schultheiss, 2007). While testosterone levels are usually high in the process of mating, they decrease in the transition to fatherhood in order to facilitate affiliative parenting behavior (van Anders et al., 2011). Accordingly, fathers of young

children who had higher levels of testosterone felt more constrained due to their paternal role (Waldvogel & Ehlert, 2017). These results do not necessarily suggest that men with a pronounced need for power are not suitable for the paternal role. Besides the more common dominant form, implicit power also contains prosocial aspects (McClelland, 1975). This socialized, more inhibited form of power is positively related to generativity including the number of children a person has (Hofer et al., 2008; Peterson & Stewart, 1993). Hence, the crucial part is to create the opportunities necessary to satisfy the specific aspects of implicit power motivation.

In conclusion, the empirical studies presented in this thesis provided evidence that the implicit motives for affiliation, achievement, and power are diversely involved in the appraisal and experience of stress, the reactivity to motive-relevant stress, as well as stress-related consequences for mental health and well-being.

10. Strengths and Limitations

The empirical studies within the present thesis contributed to the existing body of literature on implicit motives by examining their relation to perceived chronic stress and mental health. The two studies did not share the same sample and data set. In the first study, vitally exhausted men completed an online survey on sociodemographic information and self-report questionnaires regarding their experience of chronic stress and health. Their implicit motives were assessed at a computer within a laboratory session. The second study focused on traditional fathers including their perception of their paternal role. All the data were collected within an anonymous online assessment.

One major strength is the assessment of the main constructs across both studies. Mental health was operationalized through both life satisfaction and vital exhaustion. Furthermore, stress was measured in different life domains, namely aspects of work and the social environment including fatherhood. This allowed for a differentiated picture on the relationship between specific types of perceived chronic stress and facets of mental health.

To assess participants' implicit motive strength, the PSE was applied. Content-coding with the PSE requires high expertise, is time consuming and labor intensive. Nevertheless, the PSE shows advantages compared to other measures such as the OMT (Schüler et al., 2015). Importantly, we ensured motive coding reliability through extensive coder training; the main coder had completed more than 100 hours of training.

Most measures applied in the empirical studies were based on self-reports of the participants. Self-reports are important instruments in psychological research as they represent an individual's perception. Transactional theories of stress emphasize the role of a person's thoughts and feelings within the stress process. Therefore, subjective measures of chronic stress are of great value. For example, students' degree of burnout was predicted by subjective but not objective workload (Jacobs & Dodd, 2003). However, self-reports bear the risk of social desirability bias (Huang, Liao, & Chang, 1998). Nevertheless, anonymous online assessment in both studies should have prevented such a bias. Still, future studies may complement these subjective perceptions with objective measures of stress. In particular, as it is difficult to distinguish the single elements in the stress process.

Since the PSE is a projective measure, it should be untainted by social desirability bias or the influence of explicit motivational beliefs. In study 1, participants answered to the PSE in a laboratory setting in person. However, participants' anonymity was ensured by using an

individual code throughout the laboratory session. For the PSE, the responsible investigator left the participant alone in the examination room to eliminate experimenter effects (Rosenthal, 1976).

As with all studies based on a cross-sectional design, the data used for the present analysis is correlational in nature. These analyses were grounded on a priori hypotheses derived from theoretical and empirical knowledge. Nevertheless, conclusions concerning the causality of the relationships cannot be drawn. Longitudinal study designs could confirm whether implicit motives measured at an earlier time point are indeed associated with the experience of chronic stress and the development of negative health states.

The last limitation concerns the generalizability of the empirical findings. For both studies, male middle-aged men were recruited. The sample in study 2 consisted of traditional fathers only. However, many more forms of fatherhood and more complex family constellations exist (Waldvogel & Ehlert, 2016). Similarly, study 1 had a homogenous sample of men with at least mild symptoms of vital exhaustion. Moreover, on average, participants were well-educated and belonged to middle to high income groups. One cannot determine whether the present results and conclusions extend to other populations as well. Future studies could choose to study participants that differ from these with respect to age range, gender, socioeconomic status, family model, or health status.

11. Conclusions and Directions for Future Research

According to national statistics, experiencing prolonged stress is an increasingly common phenomenon (e.g., Grebner et al., 2010). Chronic stress has different sources including social relationships such as one's family as well as a person's workplace. Through behavioral, emotional, and physiological pathways, chronic stress is linked to impairments in physical and mental health. Consequently, prevalence rates for mental health problems and reduced well-being are on a rise as well (APA, 2016; Chrousos, 2009). Hence, research is required to identify which types of stress are most detrimental with regard to an individual's health and quality of life.

However, researchers face the challenge to distinguish stressors from stress, as well as stress from its consequences. In the present thesis, the experience of chronic stress and mental health were assessed using subjective self-report measures. No objective measures such as the quantity of stressors were available. Even though subjective data are of great value, individuals are required to accurately indicate their experience of stress over a longer period of time. These ratings are likely to suffer from memory bias. Approaches like ecological momentary assessment allow for the assessment of psychosocial stress in a timely manner. Furthermore, it would allow for a more detailed assessment. More information could be obtained such as specifics of the situation, interpersonal aspects, and the cognitions and emotions involved. Nevertheless, measures from a prolonged period of time are necessary to determine the chronicity of stress. Additionally, there may be interaction effects between acute and chronic stress (e.g., Lumley et al., 2014). Therefore, future research should design longitudinal studies on a diary basis.

As implicit motives are aroused in response to incentives and have been shown to interact with situational variables in predicting outcomes (e.g., Oxford, Tiedtke, Ossman, Özbe, & Schultheiss, 2017), new insights may be gained by combining implicit motives with real-time data. So far, only one diary study and one study using momentary assessment have been conducted with respect to implicit motivation (Bender, Woike, Burke, & Dow, 2012; McAdams & Constantian, 1983).

Future studies should also replicate and expand the present findings on the role of implicit motives in the perception of stress and the stress-strain relationship. The beneficial effect for affiliation on stress and health through social support processes deserves more thorough investigation. Moreover, the present results highlight the relevance of implicit achievement for

the social environment. According to Baumeister and Leary (1995), social relationships constitute a major part of our lives and their maintenance is of great relevance for an individual's functioning and well-being. Therefore, for future research questions on social interactions, it is recommended not only to turn to affiliation and power but also include the implicit need for achievement.

Furthermore, the present thesis found only partly evidence for the influence of implicit power on the stress process. Further studies should continue to explore the role of power, particularly in the context of occupational stress.

With respect to implications for practice, the findings from the empirical studies indicate that an individual's implicit motives need to be taken into account before making adjustment to his or her environment. On an enterprise level, the goal should be a reduction in workload, creating a culture of social recognition, and offering more opportunities for social interaction within work. As the results in this thesis suggest, these measures would buffer against developing exhaustion states. Moreover, they would contribute to satisfy the implicit motives for affiliation and achievement, and thus increase positive affect in their employees.

On an individual level, having knowledge about the strength and meaning of one's own implicit motives would be the first step to actively create an environment for optimal motive satisfaction. For example, for men motivated for affiliation, spending time within their families would have positive effects for their well-being as well as physical and mental health.

To reach a final conclusion, this dissertation provided evidence for the complex role of implicit motivation in stress and mental health. The implicit motives for affiliation and power are diversely involved in men's perception of stress in fatherhood. Furthermore, affiliation and achievement were found to determine the perception of social support from others, which has a buffering effect on chronic stress. Future research should aim to confirm and advance these findings. The present thesis further showed that implicit motives interact with specific stressful situations, and thus have differential effects on subsequent mental health. For example, for men with a stronger need for affiliation or achievement, social stress will lead to greater impairments. Deriving from these results, making adjustment to a person's work environment based on their motive strength would create more opportunities for motive satisfaction, and thus would promote an individual's mental health and well-being.

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Appendix

Picture Story Exercise

Instructions (in English; adapted from Schultheiss & Pang, 2007):
Welcome to the Picture Story Exercise!

In this exercise, your task is to write a complete story about each of a series of six pictures - an imaginative story with a beginning, a middle, and an end.
Try to portray who the people in each picture are, what they are feeling, thinking, and wishing for. Try to tell what led to the situation depicted in each picture and how everything will turn out in the end.
Please write your story in the empty box that you will see on the screen. In the top left corner, you'll find some helpful questions, which should only be regarded as support in writing your story. You do NOT need to answer these questions specifically.

Each picture will be presented for ten seconds. After it has disappeared, write whatever story comes to your mind. Please do not let yourself get distracted by the quality of the pictures. Don't worry about grammar, spelling, or punctuation - they are of no concern here.
You will have about four minutes for each story; the computer will then let you know when you have 60 and 20 seconds left. Please try to write for the entire time even when you might repeat yourself.

The following helping questions adapted from Atkinson (1958) are shown on the page where participants write their stories:
What is happening? Who are the people?
What happened before?
What are the people thinking about and feeling? What do they want?
What will happen next?

Instructions (in German):

Willkommen zur Bildergeschichten-Übung!

In dieser Übung wird es Ihre Aufgabe sein, zu insgesamt sechs Bildern je eine vollständige Geschichte zu schreiben – eine fantasievolle Geschichte mit einem Anfang, einem Hauptteil und einem Schluss.

Versuchen Sie zu schildern, wer die Menschen auf dem jeweiligen Bild sind, was diese fühlen, denken und welche Wünsche sie haben. Versuchen Sie zu erzählen, wie es zu dieser Situation kam, die auf dem Bild dargestellt ist und wie die Geschichte zu Ende geht.

Bitte schreiben Sie Ihre Geschichte in das leere Fenster, das Sie auf dem Bildschirm sehen. In der oberen linken Ecke stehen zudem einige hilfreiche Fragen - diese sollten Sie nur als Hilfestellung für die Verfassung Ihrer Geschichten betrachten. Sie müssen diese Fragen NICHT speziell beantworten.

Jedes Bild wird Ihnen 10 Sekunden lang gezeigt. Nachdem es verschwunden ist, schreiben Sie bitte einfach die Geschichte, die Ihnen dazu in den Sinn kommt. Bitte lassen Sie sich nicht von der Qualität der Bilder ablenken. Grammatik, Rechtschreibung und Zeichensetzung spielen ebenfalls keine Rolle.

Sie werden für jede Geschichte etwa vier Minuten Zeit haben; der Computer wird Sie wissen lassen, wenn nur noch 60 respektive 20 Sekunden verbleiben. Bitte nutzen Sie möglichst die gesamte Zeit zum Schreiben, auch wenn Sie sich eventuell wiederholen.

Was passiert gerade? Wer sind die Personen auf dem Bild?

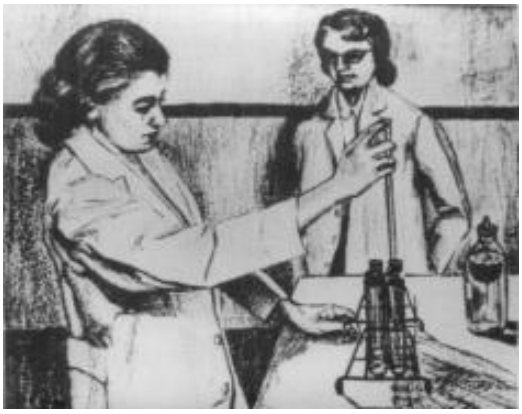
Was ist vorher passiert?

Was denken die Personen und was fühlen Sie? Was wünschen Sie sich?

Was wird als nächstes passieren?

Picture Cues

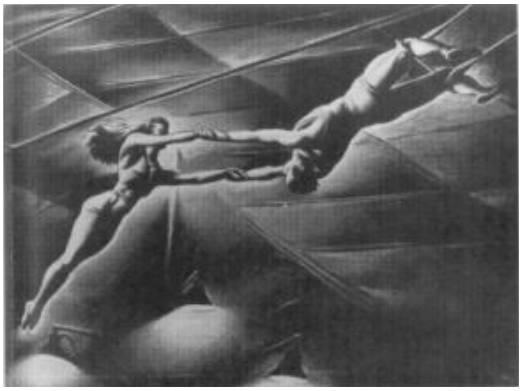
Women in Laboratory



Ship Captain

Couple by River

Trapeze Artists



Nightclub

Boxer